

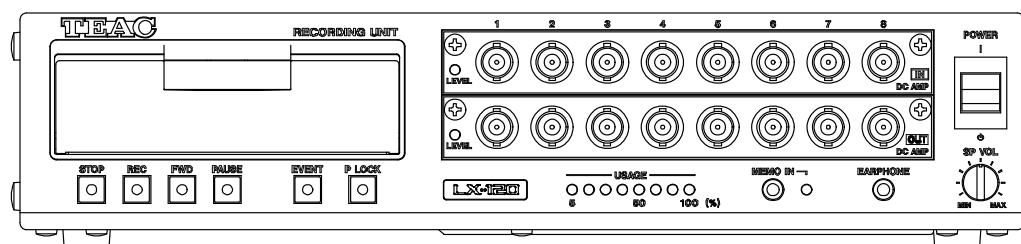
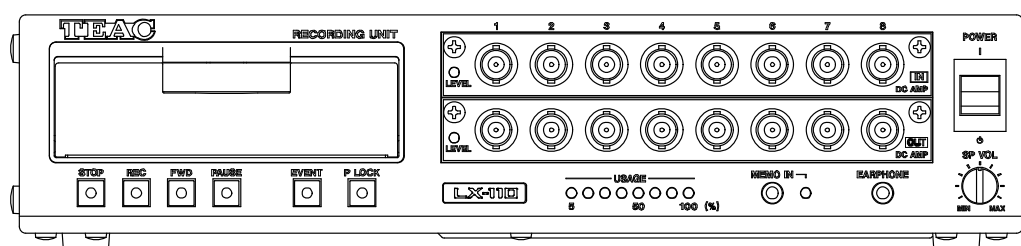
TEAC

RECORDING UNIT

LX-100 Series

Instruction Manual

Please read this manual before using the product
and keep the manual handy.



SAFETY INSTRUCTIONS

CAUTION:

- Read all of these Instructions.
- Save these Instructions for later use.
- Follow all Warnings and Instructions marked on the product.

- 1) Read instructions -- All the safety and operating instructions should be read before the product is operated.
- 2) Retain instructions -- The safety and operating instructions should be retained for future reference.
- 3) Heed Warnings -- All warnings on the product and in the operating instructions should be adhered to.
- 4) Follow instructions -- All operating and use instructions should be followed.
- 5) Cleaning -- Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- 6) Attachments -- Do not use attachments not recommended by the product manufacturer as they may cause hazards.
- 7) Water and Moisture -- Do not use this product near water -- for example, near a bath tub, wash bowl, kitchen sink, or laundry tub; in a wet basement; or near a swimming pool; and the like.
- 8) Accessories -- Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.
- 9) Ventilation -- Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
- 10) Power Sources -- This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.
- 11) Grounding or Polarization -- This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
- 12) Power-Cord Protection -- Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.
- 13) Lightning -- For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the product due to lightning and power-line surges.
- 14) Overloading -- Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in risk of fire or electric shock.
- 15) Object and Liquid Entry -- Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
- 16) Servicing -- Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

17) Damage Requiring Service -- Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

- a) when the power-supply cord or plug is damaged.
- b) if liquid has been spilled, or objects have fallen into the product.
- c) if the product has been exposed to rain or water.
- d) if the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
- e) if the product has been dropped or damaged in any way.
- f) when the product exhibits a distinct change in performance -- this indicates a need for service.

18) Replacement Parts -- When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.

19) Safety Check -- Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

20) Heat -- The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

SAFETY INSTRUCTIONS

FCC Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution

Changes or modifications to this equipment not expressly approved by TEAC CORPORATION for compliance could void the user's authority to operate this equipment.

For the customers in Europe

WARNING

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Pour les utilisateurs en Europe

AVERTISSEMENT

Il s'agit d'un produit de Classe A. Dans un environnement domestique, cet appareil peut provoquer des interférences radio, dans ce cas l'utilisateur peut être amené à prendre des mesures appropriées.

Für Kunden in Europa

Warnung

Dies ist eine Einrichtung, welche die Funk-Entstörung nach Klasse A besitzt. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen ; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.

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This agreement is governed by the laws of Japan.

Should you have any questions concerning this Agreement, or if you desire to contact TEAC for any reason, please write to the address set forth below:

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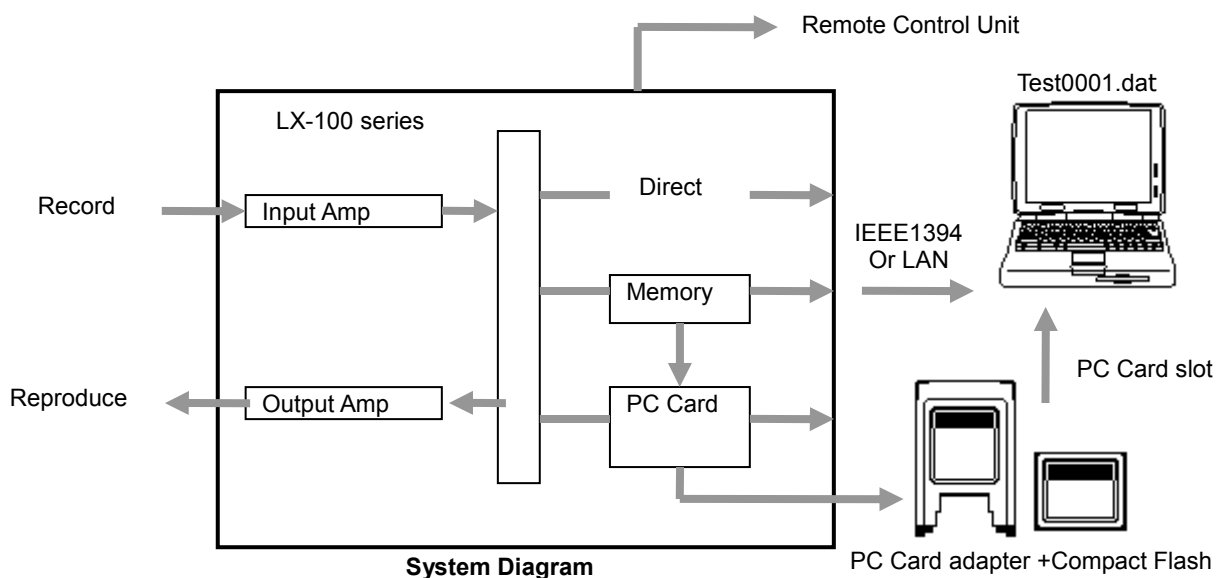
Section 1 Preface

Overview

The LX-100 series instrumentation data recorders can record and reproduce signals of a maximum of 48 kHz sampling frequency via 8 channels onto PC card media in the case of 16bit AD. Recorded data on the media is stored as PC files. The maximum number of input channels is 32 by using the selectable types of the 8-channel input cards and the optional channel expansion unit. You can choose the recording media from among the followings: Recording to the internal memory or to a PC card. Also, you can save the recorded data as PC files by connecting to a PC. The file format is TEAC's proprietary TAFFmat format. TAFFmat files can be loaded into commercially available analysis software.

From a PC you can use the supplied LX Navi software to set recording conditions such as the input range or sampling frequency. The interface with a PC is hot-pluggable and compatible with IEEE 1394. So, after the setup, you can disconnect the LX while the power is still on, and start or stop recording by using control buttons on the main unit. You can choose the 100BASE-TX Ethernet interface as an alternative. You can also use LX Navi to record or reproduce while connected to a PC.

An optional color LCD remote control unit is available to set recording conditions, to record and reproduce, and to monitor by use of bar meters.



Features

■ Input/Output Amps

The LX main unit is equipped with two slots and the optional expansion unit provides an additional two slots for installing the input amps and/or the output amps. The input/output amp provides 8-channel inputs/outputs from the selections below.

DC input amp card: Use to connect voltages and/or to connect signals of external amplifiers.

PA amp input card: In addition to voltages, a voltage output accelerometer input providing an A/C weighting filter can be connected directly.

ST amp input card: Use to connect strain gauges (full bridge) and/or gage-type sensors, and also voltages.

Analog output amp card: Use to reproduce analog signals.

■ Recording Modes

You can use the PC card drive for data recording onto a removable media.

Memory recording: Recording up to 64MB (add up to 576MB as an option) of internal memory.
Stored data can be transferred to the removable media or the PC.

PC card recording: Stored data on the PC card (Compact Flash + PC card adapter) can be loaded into the PC by using the PC card slot. By supporting FAT32, you can use a PC card with a maximum of 8GB as a media.

PC recording: Recording directly to the PC.

You can also transfer data to a PC while recording to memory or the media, or automatically save to the media after recording to memory.

■ Quantization Bits

Either conventional 16 bits A/D or 24 bits A/D, providing a dynamic range of 100db, can be selected.

■ Sampling Frequency Series

In addition to the LX-110, which provides two series of sampling frequency - a 96 kHz sampling frequency and a low-speed sampling, the LX-120 enables one to select as five series of sampling frequency - 102.4 kHz, 100 kHz, 96 kHz, 65.536 kHz and a low-speed sampling.

■ Interface with PC

Either IEEE1394 for high-speed data transfer or 100BASE-TX LAN for network environment can be selected.

■ Real Time Monitor

You can monitor the data as formats of waveforms, bar graphs, and digital displays on the PC display while recording. And, you can reproduce the recorded data in the internal memory or the media.

■ A Variety of Recording Triggers

Manual: Starts recording manually.

Level Trigger: Starts recording by detecting level changes in a specified channel.

External Trigger: Starts recording by using an external signal as the trigger.

Pre-trigger: A pre-trigger can record the data that was read into a buffer before a recording-start condition (based on a level trigger or external trigger) is satisfied.

Post-trigger: Continues to record for a set period even after a recording-stop condition (based on a level trigger or external trigger) has been satisfied.

Features

■ Event Marks

You can mark the data during recording. Then you can search for such event marks when you want to reproduce some recorded data.

■ Recording and Reproducing Voice Memos

A microphone amp and a speaker are built in so that you can record and reproduce (listen to) voice memos.

■ Synchronization recording of multi units (optional)

An optional synchronization recording can be made in maximum of 4 units (one for a master unit, three for slave units).

■ Synchronization recording of camera pictures (optional)

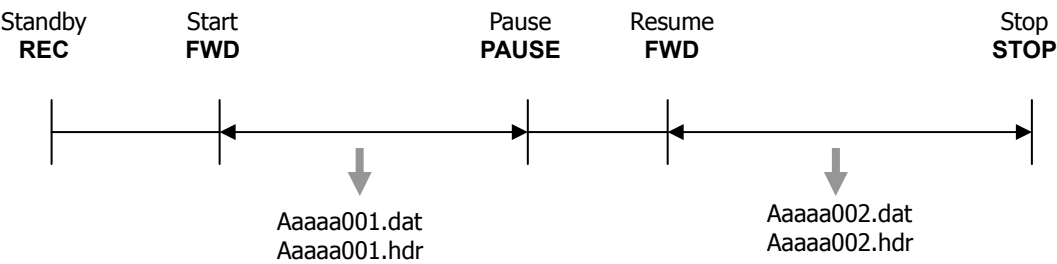
A synchronization recording can be made with pictures by connecting the Visual Recorder "AQ-VU", providing a recording of 4ch camera pictures.

About TAffmat

TAFFmat (an acronym for Teac Data Acquisition File Format) is a file format composed of the following: **(1)** A data file containing A/D (analog to digital) converted data that is in binary format with the extension dat. **(2)** A header file containing information, such as recording conditions, that is in text format with the extension hdr.

This document uses the term ID to refer to a collection of data collected from the start of recording on the LX series until the recording is stopped or paused. For each ID, one data file and one header file is recorded. A voice memo is recorded as a WAV file with the extension wav.

The above files share a common file name, to which is appended an ID number. When a new file name is specified, this ID number becomes 1. Each time recording starts, this number advances by 1.

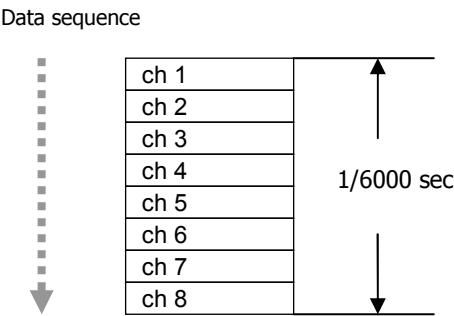


A/D-converted data is recorded as 2-byte integers between -32768 and +32767 in the case of 16 bits A/D and also recorded as 4-byte integers between -8388608 and +8388607 in the case of 24 bits A/D. Negative numbers are expressed as complements of 2. The byte order is from the lower bytes to the higher bytes. The sequence of data is as follows: first sampling channel order, second sampling channel order,, last sampling channel order.

In LX-100 series, $\pm 100\%$ of the input range is equivalent to ± 25000 of 16 bits A/D or ± 6400000 of 24 bits A/D

This document uses the term “scan” to refer to a collection of data resulting from one sampling. A data file consists of scan repetitions.

Example: The data of 1 scan when the sampling frequency is 6 kHz:



Notes on Usage

Notes on Usage

Use of an UPS is Recommended

We recommend that you use an UPS (Uninterruptible Power Supply) whenever you use an AC adapter. This can protect important data during a power stoppage. If the power is turned off while a media is in a drive, data recorded on that media might become unreadable.

Use an optional battery unit to back up the operation on power stoppages.

Use Specified Media Only

Use PC cards checked by TEAC in advance (contact us for information). Other media might be unable to record or reproduce correctly.

Compact Flash Cards Checked by TEAC for Correct Operations (as of July 2007)

SanDisk Corp.		Lexar Media, Inc.		Buffalo Technology, Inc.	
128MB	SDCFB-128-801	Professional		RCF-G series	
1GB	SDCFB-1000-801	1GB	CF1GB-80-380	256MB	RCF-G256M
	SDCFB-1024-J60	4GB	CF1GB-133-380	1GB	RCF-G1G
2GB	SDCFB-2048-J60	Hagiwara Sys-Com		RCF-G series	
4GB	SDCFB-4096-J60NS			2GB	RCF-R2G
ultra		Z-Pro series			
128MB	SDCFB-128-801	1GB	HPC-CF1GZP		
512MB	SDCFB-512-801	2GB	HPC-CF1GZP		
ultra II		I-O DATA DEVICE, INC.			
256MB	SDCFH-256-903				
1GB	SDCFH-1024-903	CFX シリーズ			
2GB	SDCFH-2048-903	256MB	CFX-256M		
ExtremeⅢ		CF40 シリーズ			
1GB	SDCFX3-1024-903	1GB	CF40-1G		
2GB	SDCFX3-2048-903	CF115 シリーズ			
4GB	SDCFX3-4096-903	8GB	CF115-8G		
8GB	SDCFX3-8192-903				

■ Turn off the power after you eject the media

Remove the PC card before powering off the LX. If the power is turned off during writing, data recorded on the media might become unreadable. Also, eject the media before moving the LX main unit. Further, remove the media before moving the LX main unit. Moving the unit while the media is inserted might result in damage.

■ Remove Media

Insert or eject the media after confirming that "MEDIA READY" is displayed on the unit that is in the STOP state of the REC mode.

■ Never Remove a Recorded File, Never Rename the File/Folder Name of a Recorded File By a Windows Operation

Do not remove a recorded file or rename a file/folder name of a recorded file by a Windows operation. If you manipulate the recorded files on the media by a Windows operation, such as partially removing the file, or renaming the file/folder name, the link between the data file and the header file will be lost or the writing speed to the media to support the specifications cannot be assured. Also, the data might be unreadable when such media is re-inserted in the LX.

When reproducing the file recorded on the PC by the main unit of LX, refer to "Notes for reproducing a PC-recorded file by the LX main unit" on page 9 in Section 5.

■ Handling PC Card

To discharge static electricity from your body, touch a metallic surface near you before handling the unit. Never touch the PC card being inserted into the PC card slot while recording and playing back.

■ Cautions for recording data on a PC Card

- The recognized file system is FAT16 or FAT32. NTFS and FAT12 are not available. (By formatting media of 16MB or less the file system will normally become FAT12.)
- Before using a PC Card on LX, format it in FAT16 or FAT32 by Windows PC. A PC Card that is not formatted cannot be formatted by the LX main unit.
- It might take a long time to recognize or save data when using a FAT32 formatted PC Card on LX. In such a case, the situation might be improved by re-formatting on the LX main unit.
- In you are using a PC Card that has been repeatedly used for saving or removing data, you might not be able to record data on the PC Card that is supposed to have sufficient free space remaining. In such a case, re-format the PC Cards again after backing up the data to another media.
- The maximum amount of free space on a PC Card, which is displayed on LX Navi, etc., is 4GB. “%” displayed on the unit means the value is correct.
- The maximum file size of the PC card available on LX is 2GB in FAT16 or 4GB in FAT32. However, the actual file size will be reduced, depending on the unit of data.
- When continuing to record data exceeding the maximum size, another new file will be made to keep on recording automatically. At this time, the header file or the voice file will be moved onto a new file. These groups (data, header, and voice) of files are recorded separately as above, and can be reproduced independently.
- If the recording condition meets either of the followings, the maximum size of the continuous recorded data would be 4GB in total. (It might exceed the value, although this is not guaranteed)
 1. Synchronization recording (master or slave setting)
 2. Timer [recording start time, specified recording time, timeout] recording
 3. Trigger [level, external trigger] recording
- If so many files are saved on the PC Card, it might take a long time to get the file table of data reproduced. In such a case, reformat the PC Cards again after backing up the data to another media.
- The maximum number of folder or data files that can be made and operated correctly is 10,000.
- The number of files exceeding 10,000 can be recorded, but not copied or reproduced.
- When using a PC Card with a low writing speed, the recording might be stopped since the data writing speed does not keep up with it. Use the recommended card only.

■ Button operations of LX main unit

In case you operate the buttons of the LX main unit that is connected with supplied LX Navi software, the LX might not operate correctly. (Operate the LX Navi first when connected to the LX Navi)

■ About the model without the PC Card drive installed

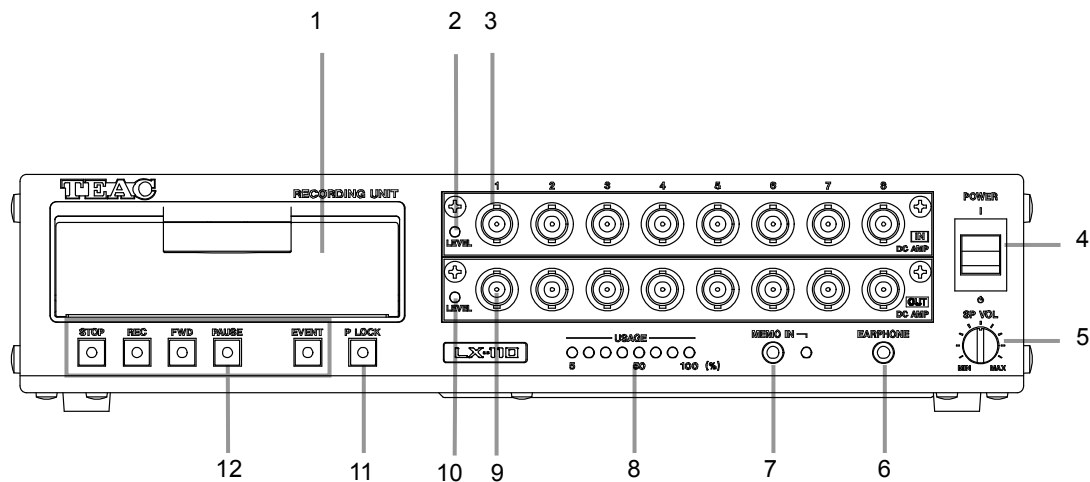
The drive is not installed. Naturally, the functions concerning the recording to the media are disabled.

■ About No Output Amp Model

The output amplifier is not installed. Naturally, the functions concerning the output amp are disabled. However, you can view the reproduced data on a PC.

Names and Parts

Names and Parts Front



1 Drive

Opening the cover reveals the disk slot.

2 Input level LED

When the input signal for a channel is larger than +/- 10 % of a set input range, the LED glows green. When the signal exceeds +/- 115 % of the range, the LED glows red.

3 Input connector

Inputs the signal to be measured.

4 Power switch

Pushing the switch up turns on the power. Pushing the switch down turns off the power.

5 Volume knob

Adjust the volume for reproducing voice memos.

6 EARPHONE jack

Connects to an earphone when you are using the earphone to listen to voice memos. When an earphone is inserted, sound does not come from the speaker.

7 MEMO IN jack

Connects to a microphone used for voice memos.

8 USAGE LEDs

Indicates the usage rate of the recording device. During recording to memory, these LEDs indicate what percentage of the total memory is being used. During recording to a media, these LEDs indicate what percentage of the total media capacity is being used. During recording to a PC, these LEDs indicate what percentage of memory is being used as the buffer for transmitting data. From the left, the LEDs indicate percentages of 5, 10, 20, 35, 50, 70, 90, and 100%.

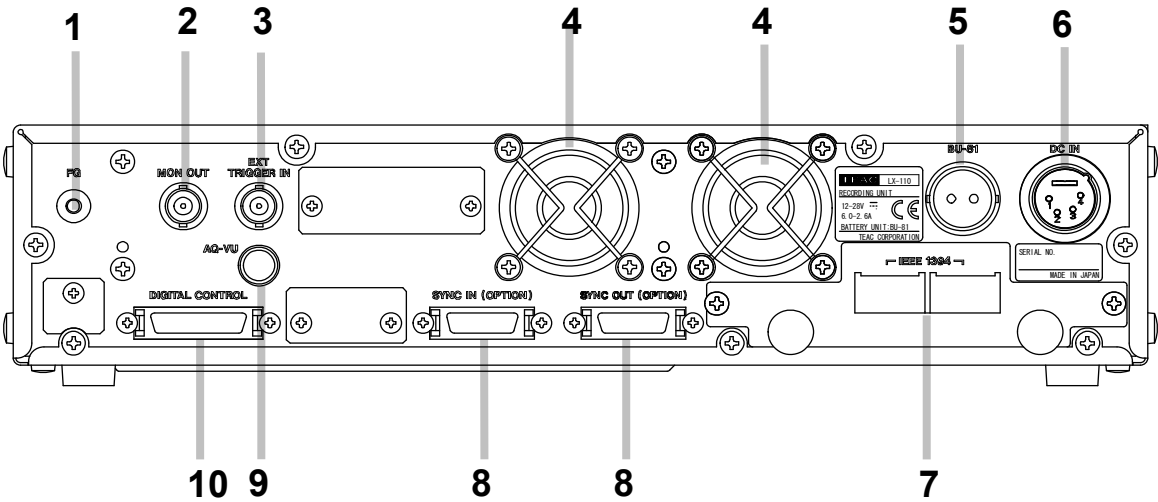
These LEDs also function as a low-voltage alarm, and blink when the power voltage falls to 11 V or less. At this time, recording and reproducing will be stopped.

- 9 Output connector (When the analog playback amp card is installed in the slot.)
Outputs the reproduced signal. Outputs the input signal during recording-standby status or during recording.
You can set the output range in 0.1 V steps, from 1 V to 5 V.
- 10 Output level LED (When the analog playback amp card is installed in the slot.)
When the output signal for a channel is larger than $\pm 10\%$ of a set output range, the LED glows green.
When the signal exceeds $\pm 115\%$ of the range, the LED glows red.
- 11 P LOCK button
Pressing this button for 3 seconds causes the lamp to glow and disables the five buttons on the left: STOP, REC, FWD, PAUSE, and EVENT. To release the lock, again press the button for 3 seconds.
- 12 Recording/reproduction control buttons
Buttons used for recording or reproduction. Details are given later.

Names and Parts

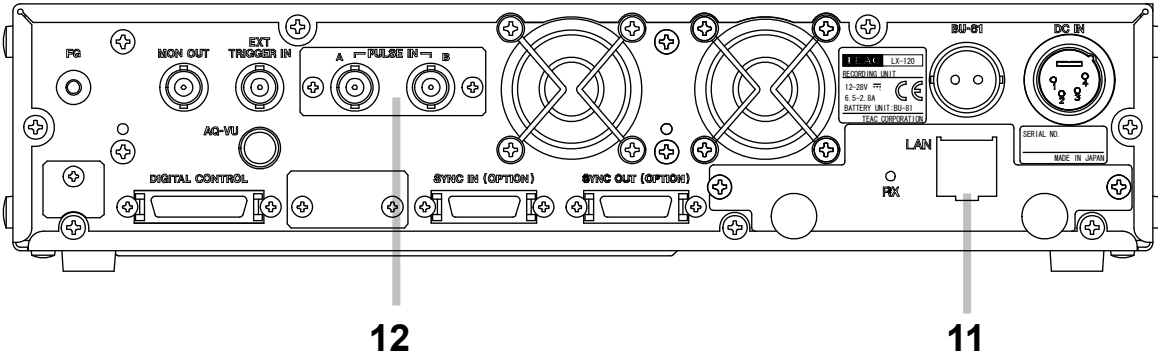
Rear

LX-110 IEEE 1394 Version



The LX-110LAN model has an interface (at 7) shown below.

LX-120 LAN Model



The LX-120 IEEE 1394 version has an interface (at 11) shown above.

1 FG terminal

Connects the grounding wire.

2 MON OUT connector

Outputs in analog format the signal of a channel during recording-standby status, recording, or reproduction. You use the supplied LX Navi software to select the channel you want to monitor. You can set the output range in 0.1 V steps, from 1 V to 5 V. The same filter as used for the output is applied to this monitor output. (Not available for analog output using low-speed sampling frequency series)

Outputs the generator output signal at the LX-120.

3 EXT TRIGGER IN connector

Inputs the trigger signal when using an external contact signal as the trigger to start recording.

4 Cooling fan

Exhaust fans used for cooling the main unit. Do not cover the outlet vent.

5 BU-81 connector (optional)

Used to connect the optional battery unit.

6 DC IN connector

Inputs power in the range of +11 to 30 V.

7 IEEE 1394 connector (for IEEE 1394 model)

Connects to a PC. Use a recommended interface card on the PC.

8 Connector for recording synchronization (optional)

It is used for recording synchronization.

9 AQ-VU synchronization connector (optional)

Used to control record start/stop and time setting.

10 DIGITAL CONTROL connector

Used when using a contact signal to control recording or reproduction.

11 100BASE-TX connector (for LAN model)

Connects to a PC. The LED-side of the connector flashes while communicating.

12 PULSE IN A/B connector (LX-120 model)

Connects tachometer pulse inputs.

Recording time

Recording time

- Recording to Memory, 8 channels, 16 bits A/D, 64 MB standard memory (when not recording voice memos)

Sampling frequency (Value in brackets is the recording bandwidth with tolerances of +/-0.5 dB)	Recording time
96 kHz (40 kHz)	40 sec
48 kHz (20 kHz)	80 sec
24 kHz (10 kHz)	160 sec
12 kHz (5 kHz)	320 sec
6 kHz (2.5 kHz)	640 sec (approx. 10 min)
3 kHz (1.25 kHz)	1,280 sec (approx. 21 min)
1.5 kHz (625 Hz)	2,560 sec (approx. 42 min)

- Recording to PC Card, 8 channels, 16 bits A/D, 1 GB PC Card (when not recording voice memos)

* This recording time at a 48 kHz sampling frequency is the value when using a PC Card on which nothing is recorded after formatting.

Sampling frequency (Value in brackets is the recording bandwidth with tolerances of +/-0.5 dB)	Recording time
48 kHz (20 kHz)	1,230 sec (approx. 20 min) ※
24 kHz (10 kHz)	2,470 sec (approx. 41 min)
12 kHz (5 kHz)	4,940 sec (approx. 82 min)
6 kHz (2.5 kHz)	9,890 sec (approx. 164 min)
3 kHz (1.25 kHz)	19,790 sec (approx. 329 min)
1.5 kHz (625 Hz)	39,360 sec (approx. 11 hour)

- Media recording time can be calculated as follows (result for approximate times)

Recording Time (seconds)

= (Media Capacity (Bytes) x 0.9) / [(Number of Analog Input Channels + Number of Tachometer Input Channels) x Sampling Frequency (Hz) x AD (width) + 8000]

Media Capacity x 0.9: Considering recording overhead of the media and an additional capacity needed for the header files, multiply 0.9 (90%) for the used capacity for data files.

AD width 2 for 16 bits A/D, 4 for 24 bits A/D

Refer to the tables later for a combination of the Sampling Frequency vs. the number of analog input channels that can be selected in each recording mode.

The number of tachometer input channels in 16 bits A/D: use "2" in 16 bits mode, "2" for 32 bits/1 channel mode, or "4" for 32 bits/2 channels mode. In 24 bits A/D: not available in 16 bits mode, "1" for 32 bits/1 channel mode, or "2" for 32 bits/2 channels mode. Tachometer input channels are available for LX-120 only. Use "0" instead of 8000 when the memo voice recording turns to OFF.

Sampling Frequency and Number of Channels

Sampling Frequency and Number of Channels

A combination of the sampling frequency vs. the number of analog input channels varies depending on the selected recording mode (e.g., the type of the recording media, the number of tachometer input channels, etc.).

- LX-110 supports the 96 kHz series only in the table of sampling frequency series. Another series is available as an optional function of LX-110.

Recording Condition 1

Recording mode: Media recording to the PC card, while transferring data to the PC

Memo Voice Recording: ON or OFF

Interface to PC: IEEE1394 or LAN

(16bitsAD/24bitsAD)

1024kHz series		Max. number of analog input channels based on the tachometer input setting			
Sampling Frequency(kHz)	Bandwidth (kHz)	No	16bits 2ch	32bits 1ch	32bits 2ch
*102.4	42	4/2	2/Unrecordable	2/Unrecordable	Unrecordable
*51.2	21	8/4	4/Unrecordable	4/2	4/2
25.6	10	16/8	8/Unrecordable	8/4	8/4
12.8	5	32/16	24/Unrecordable	24/8	24/8
5.12	2	32/16	32/Unrecordable	32/16	32/16
2.56	1	32/16	32/Unrecordable	32/16	32/16
1.28	0.53	32/16	32/Unrecordable	32/16	32/16

(16bitsAD/24bitsAD)

100kHz series		Max. number of analog input channels based on the tachometer input setting			
Sampling Frequency(kHz)	Bandwidth (kHz)	No	16bits 2ch	32bits 1ch	32bits 2ch
*100	41	4/2	2/Unrecordable	2/Unrecordable	Unrecordable
*50	20	8/4	4/Unrecordable	4/2	4/2
20	8	16/8	8/Unrecordable	8/4	8/4
10	4.1	32/16	24/Unrecordable	24/8	24/8
5	2	32/16	32/Unrecordable	32/16	32/16
2	0.8	32/16	32/Unrecordable	32/16	32/16
1	0.4	32/16	32/Unrecordable	32/16	32/16

(16bitsAD/24bitsAD)

96kHz series		Max. number of analog input channels based on the tachometer input setting			
Sampling Frequency(kHz)	Bandwidth (kHz)	No	16bits 2ch	32bits 1ch	32bits 2ch
*96	40	4/2	2/Unrecordable	2/Unrecordable	Unrecordable
*48	20	8/4	4/Unrecordable	4/2	4/2
24	10	16/8	8/Unrecordable	8/4	8/4
12	5	32/16	24/Unrecordable	24/8	24/8
6	2.5	32/16	32/Unrecordable	32/16	32/16
3	1.25	32/16	32/Unrecordable	32/16	32/16
1.5	0.625	32/16	32/Unrecordable	32/16	32/16

Sampling Frequency and Number of Channels

(16bitsAD/24bitsAD)

65.536kHz series		Max. number of analog input channels based on the tachometer input setting			
Sampling Frequency(kHz)	Bandwidth (kHz)	No	16bits 2ch	32bits 1ch	32bits 2ch
*65.536	27	4/2	2/Unrecordable	2/Unrecordable	Unrecordable
*32.768	13	8/4	4/Unrecordable	4/2	4/2
16.384	6	16/8	8/Unrecordable	8/4	8/4
8.192	3	32/16	24/Unrecordable	24/8	24/8
4.096	1.7	32/16	32/Unrecordable	32/16	32/16
2.048	0.8	32/16	32/Unrecordable	32/16	32/16
1.024	0.4	32/16	32/Unrecordable	32/16	32/16

Remarks: Cannot select the moving average other than 1 (one) at the Sampling Frequency settings shown with *(asterisk).

In 24 bits A/D, 2 ch (16 bits) of tachometer input is not available.

When using LAN as the main unit interface, continuous recording operations might not be possible (it might be stopped while recording because all of the memory has been used) on setting the maximum number of recording channels. In such a case, decrease the data transfer rate by decreasing the sampling frequency by half or by decreasing the number of recording channels by half, and use the LX main unit.

Sampling Frequency and Number of Channels

Recording Condition 2

Recording Mode: Recording to the internal memory or direct recording to the PC

Memo Voice Recording: ON or OFF

Interface to PC: IEEE1394 or LAN

102.4kHz series		Max. number of analog input channels based on the tachometer input setting			
Sampling Frequency(kHz)	Bandwidth (kHz)	No	16bits 2ch	32bits 1ch	32bits 2ch
*102.4	42	8/4	4/Unrecordable	4/2	Unrecordable
*51.2	21	16/8	8/Unrecordable	8/4	8/4
25.6	10	32/16	24/Unrecordable	24/8	24/8
12.8	5	32/16	32/Unrecordable	32/16	32/16
5.12	2	32/16	32/Unrecordable	32/16	32/16
2.56	1	32/16	32/Unrecordable	32/16	32/16
1.28	0.53	32/16	32/Unrecordable	32/16	32/16

(16bitsAD/24bitsAD)

100kHz series		Max. number of analog input channels based on the tachometer input setting			
Sampling Frequency(kHz)	Bandwidth (kHz)	No	16bits 2ch	32bits 1ch	32bits 2ch
*100	41	8/4	4/Unrecordable	4/2	Unrecordable
*50	20	16/8	8/Unrecordable	8/4	8/4
20	8	32/16	24/Unrecordable	24/8	24/8
10	4.1	32/16	32/Unrecordable	32/16	32/16
5	2	32/16	32/Unrecordable	32/16	32/16
2	0.8	32/16	32/Unrecordable	32/16	32/16
1	0.4	32/16	32/Unrecordable	32/16	32/16

(16bitsAD/24bitsAD)

96kHz series		Max. number of analog input channels based on the tachometer input setting			
Sampling Frequency(kHz)	Bandwidth (kHz)	No	16bits 2ch	32bits 1ch	32bits 2ch
*96	40	8/4	4/Unrecordable	4/2	Unrecordable
*48	20	16/8	8/Unrecordable	8/4	8/4
24	10	32/16	24/Unrecordable	24/8	24/8
12	5	32/16	32/Unrecordable	32/16	32/16
6	2.5	32/16	32/Unrecordable	32/16	32/16
3	1.25	32/16	32/Unrecordable	32/16	32/16
1.5	0.625	32/16	32/Unrecordable	32/16	32/16

(16bitsAD/24bitsAD)

65.536kHz series		Max. number of analog input channels based on the tachometer input setting			
Sampling Frequency(kHz)	Bandwidth (kHz)	No	16bits 2ch	32bits 1ch	32bits 2ch
*65.536	27	8/4	4/Unrecordable	4/2	Unrecordable
*32.768	13	16/8	8/Unrecordable	8/4	8/4
16.384	6	32/16	24/Unrecordable	24/8	24/8
8.192	3	32/16	32/Unrecordable	32/16	32/16
4.096	1.7	32/16	32/Unrecordable	32/16	32/16
2.048	0.8	32/16	32/Unrecordable	32/16	32/16
1.024	0.4	32/16	32/Unrecordable	32/16	32/16

Sampling Frequency and Number of Channels

Remarks: Cannot select the moving average other than 1 (one) at the Sampling Frequency settings shown with *(asterisk).

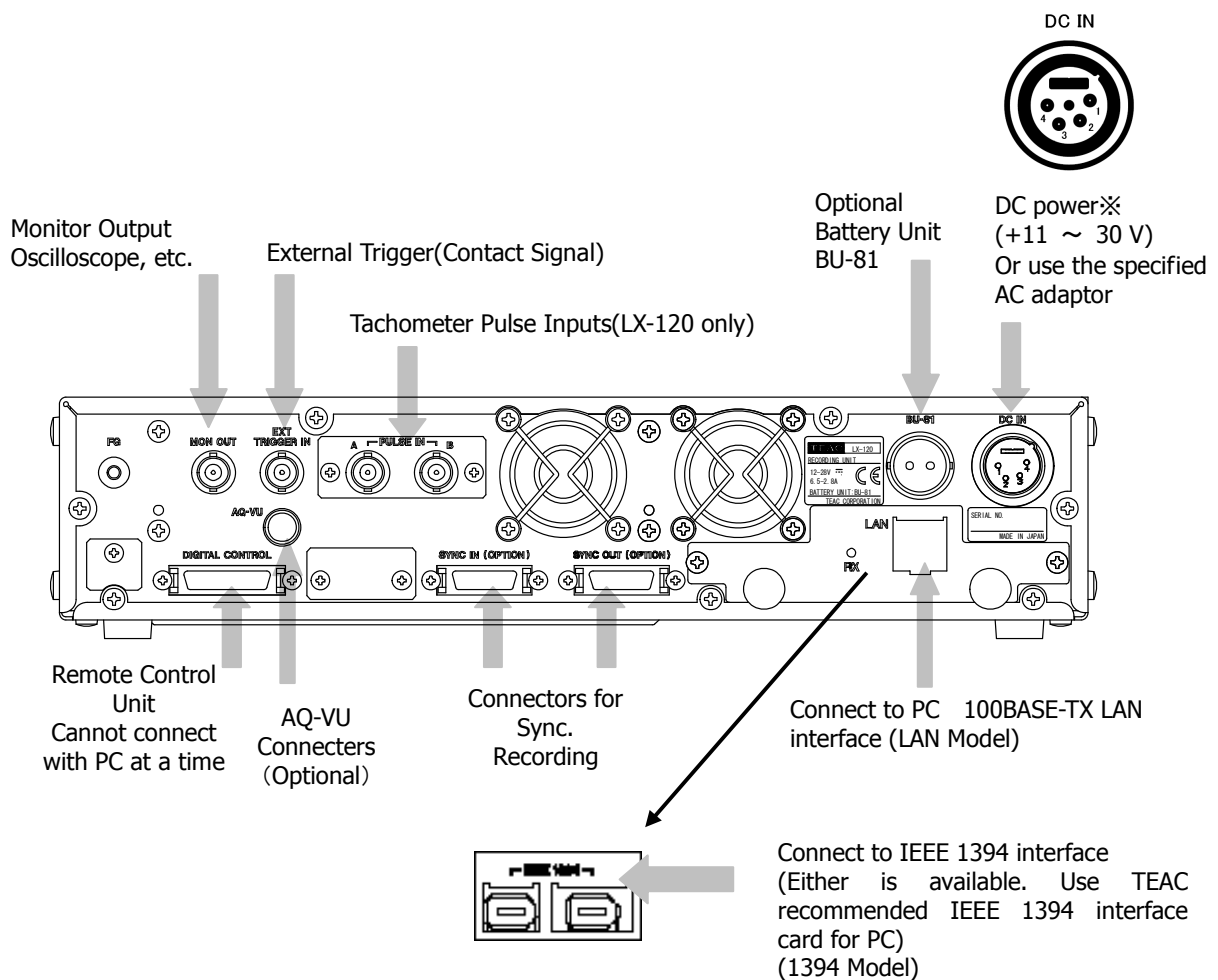
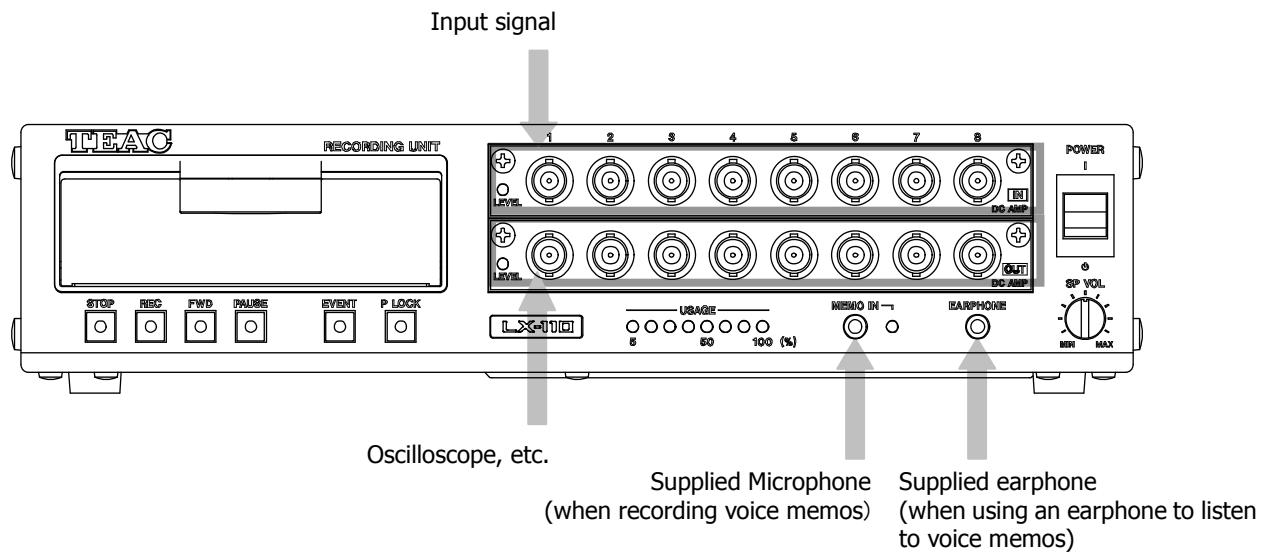
In 24 bits A/D, 2ch (16 bits) of tachometer input is not available.

When using LAN as the main unit interface and PC direct recording, continuous recording operations might not be possible (it might be stopped while recording because all memory has been used) on setting the maximum number of recording channels. In such a case, increase the data transfer rate by decreasing the sampling frequency by half or by decreasing the number of recording channels by half, and use the LX main unit.

Section 2 Installation

Connections

Connections

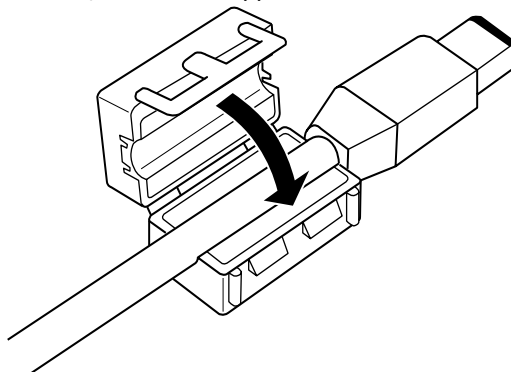


※ When the DC power voltage falls to +11V or less, the USAGE LEDs flash and the recording and reproduction stop. If you are recording to memory, quickly copy the data to a media or to a PC.

Notes of Connections

■ Attaching Ferrite Core on IEEE 1394 Interface cable (IEEE 1394 model)

To reduce the radio noise, attach the supplied ferrite cores on both ends of the IEEE 1394 cable.



■ IEEE1394 connector is available for PC only (IEEE1394 model)

Do not connect devices other than the PC to the IEEE 1394 connector. If any other devices are daisy-chained, the specified performance may not be achieved.

■ Grounding

To prevent noise, establish a common ground for the LX and all the measuring instruments connected to it.

PC Requirements

We recommend use of a PC that satisfies the following requirements:

OS: Windows XP / Windows 2000

CPU: Pentium4 2GHz or more

Screen Resolution: 1024×768 dpi or better

Memory: 512 MB or more

Free space on hard disk: 2 GB or more

CD-ROM drive: Present (for the program installation)

For IEEE 1393 model: Specified IEEE1394 interface card

For a note PC (PC card model): From RATO Systems, Inc.: CBFW3

For a desktop PC (PCI bus): From RATO Systems, Inc.: PCIFW3

For LAN model: use your PC on-board 100BASE-TX interface.

Remarks: It might not be possible to record continuously at a high sampling speed depending on the relationship between the resident program, the operating state of other driver applications, and the HDD speed.

■ Use the IEEE 1394 interface card specified above. Please contact us for availability. Other interface cards might not operate correctly. When installing and setting up the interface card, read the documentation supplied with the card and set up the card in accordance with that documentation and this manual.

■ Use the on-board type 100BASE-TX interface of your PC. Do not use the PC card type of interface.

■ File sizes or the total number of files, which can be handled on PC, may be limited depending on the file systems.

Installing LX-100 Series (IEEE 1394 model)

Installing LX-100 Series (IEEE 1394 model)

An overview of the LX-100 (IEEE 1394 model) installation is explained below. Follow the installation procedures explained later for each operating system.

1. Attach the interface card to your PC.
2. Install the OHCI driver.
3. Install the LX-100 Series device driver.
4. Install the LX Navi.

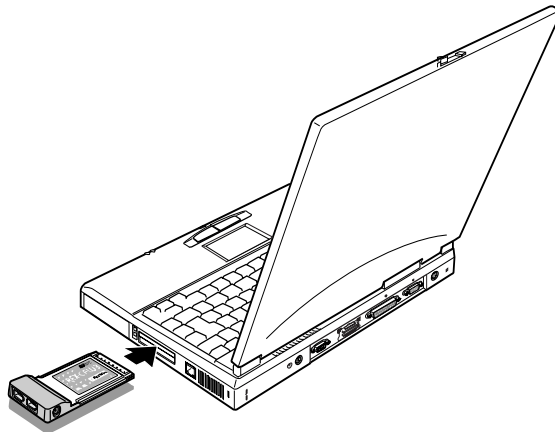
Installing Interface Card

Attach the PC card to your note PC

Insert the IEEE 1394 interface card CBFW3 to your PC card slot met the CardBus specification.

Check with your PC manual for the PC card slot information.

- You may not insert the IEEE 1394 interface card with other types of PC card at the same time.
- You may not install it in the upper slot.
- Be careful when inserting it in your PC. The interface card or your PC may be damaged, if you force it when inserting it.



Attach the PCI card to your desktop PC

Insert the PCI type interface card PCIFW3 in the PCI slot of your desktop PC.

Check with your PC manual for the PCI slot information.

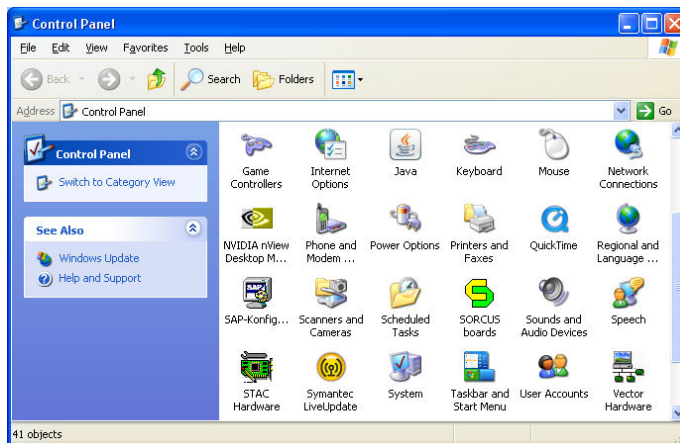
- Replace a standard bracket by the supplied low profile one when installing the PCIFW3.
- Be careful when inserting it in your PC.

The interface card or your PC may be damaged, if you force it when inserting it.

Installing OHCI Driver

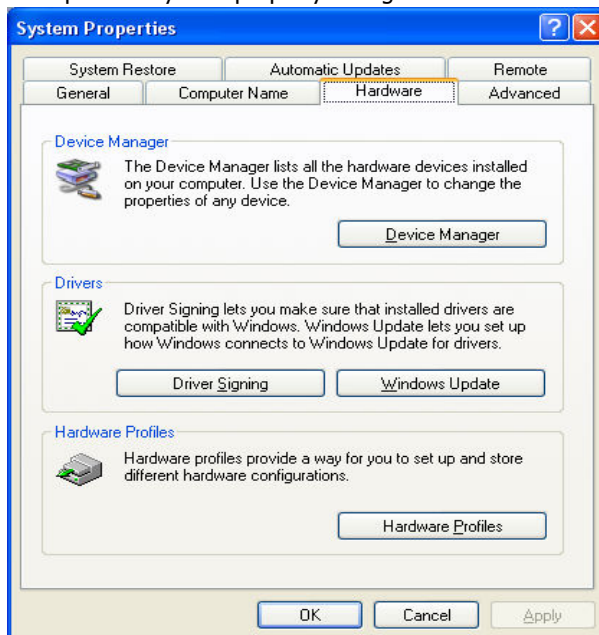
The following screen samples are for Windows XP. However, these operations are helpful for Windows 2000.

1. Insert the CBFW3 in the CardBus PC card slot, or insert the PCIFW3 and then turn on your PC. The standard Windows driver will be automatically installed. Follow the procedures below to confirm that the driver has been installed correctly.
2. Double click [Control Panel] from [My Computer] to open the Control Panel (classical appearance) window.



Double click [System] to open the dialog box.

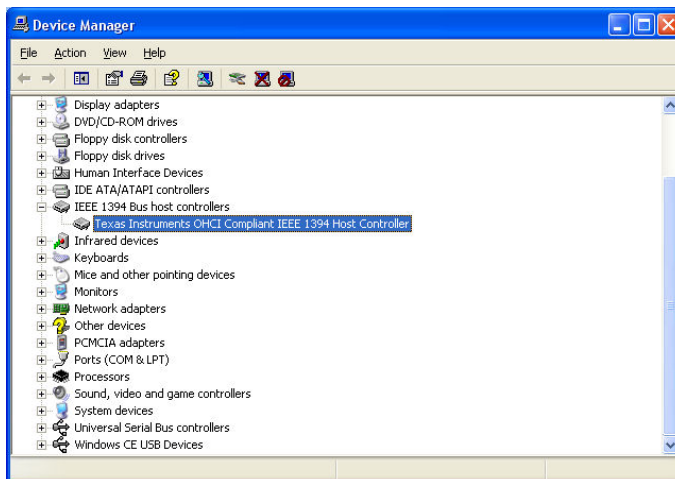
3. Open the system property dialog.



Click [Hardware] tab, and then click [Device Manager(D)].

Installing LX-100 Series (IEEE 1394 model)

4.



Double click [1394Bus host Controllers], and confirm that “Texas Instruments OHCI Compliant IEEE 1394 Host Controller” is added to indicate that the driver software has been correctly installed.

Now the OHCI driver installation has been completed. Next proceed to the LX-100 Series device driver installation.

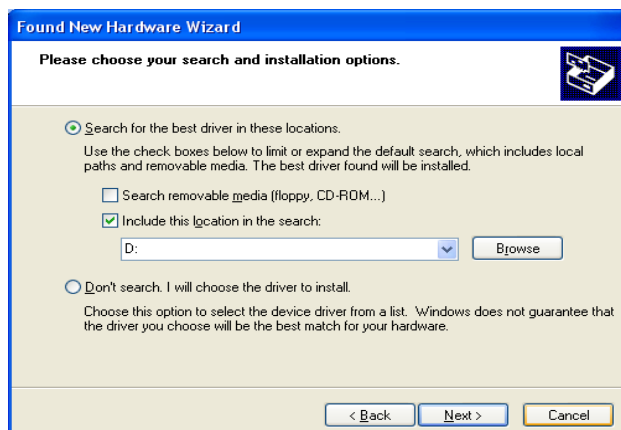
Install LX-100 Series Device Driver

The following screen samples are for Windows XP. However, these operations are helpful for Windows 2000.

1. When the LX-100 is first connected to the PC, the following screen is displayed.



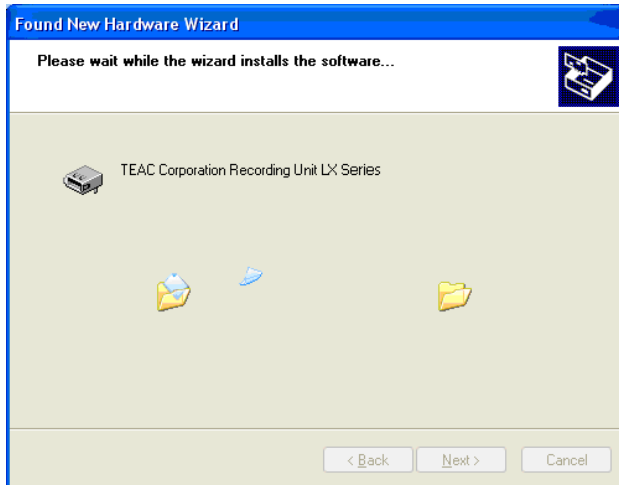
2. Click [Next]. The Following screen will be displayed.



Installing LX-100 Series (IEEE 1394 model)

Select "Search for the best driver in these locations" and "Include this location in the search:" Enter the file path of the CD-ROM drive in the combo-box ("D:¥Driver" in the example above) and click [Next] to proceed.

3. The following screen will be displayed as Windows copies the required driver.



4. The following screen will display the completion of the driver installation.



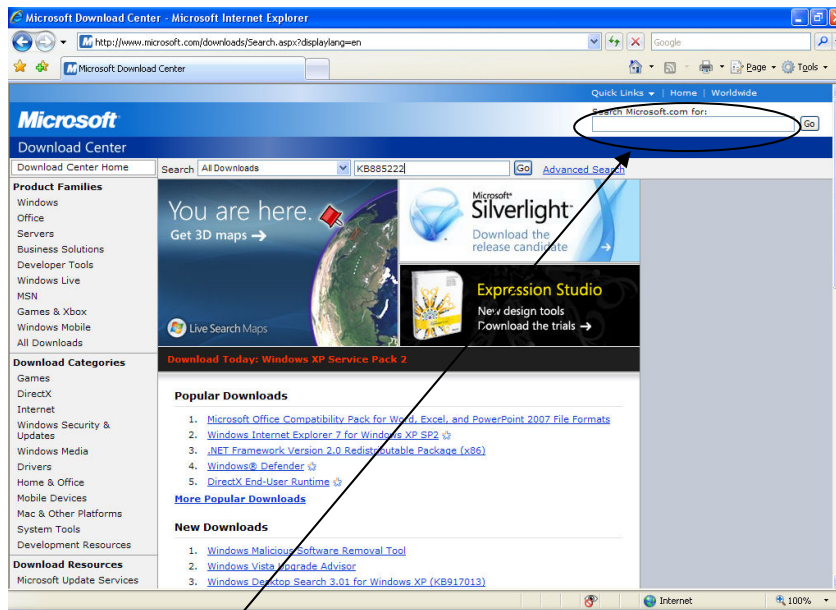
In the dialog box, click [Finish]. This completes installation of the device driver.

Installing LX-100 Series (IEEE 1394 model)

Download the 1394 Storage Supplement Program

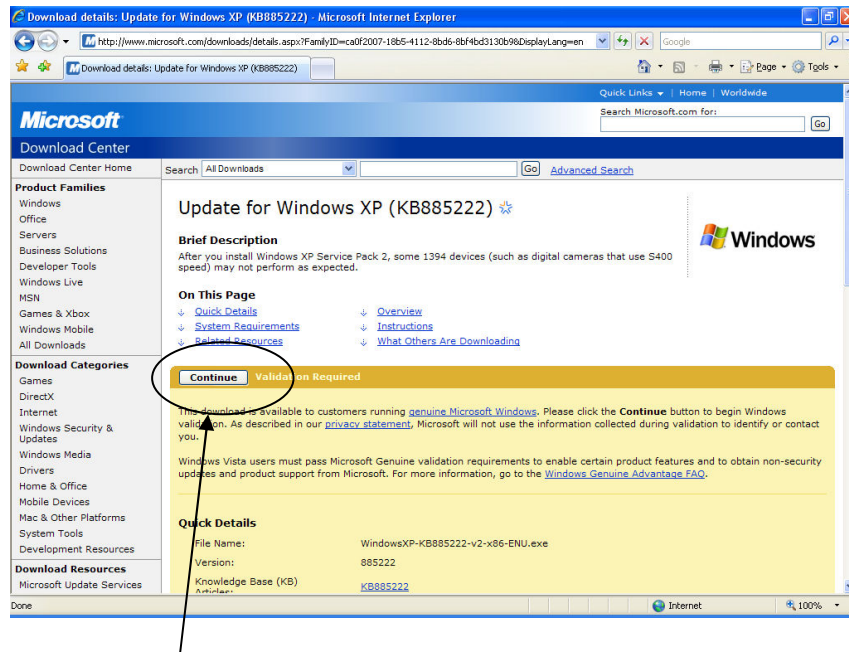
From the Microsoft site, download the 1394 Storage Supplement program. This program will fix the problem of the 1394 storage device (using transfer rate of S400) not operating according to the supposed specification. Update the program by the following steps. Make sure to update it when using WindowsXP (SP2).

1. Start to open the "Windows Update" page of Microsoft. The following screen will appear.



Enter "KB885222" in the empty box and press the "Go" button to find the update program (KB885222) of Microsoft. (The above screen was taken from the Microsoft web site of September, 2007.)

2. The Following Download Center site for the Microsoft Windows XP update program (KB885222) will be displayed.



Press the "Continue" button to begin installation of the program according to the contents of the Microsoft Windows XP update program. (The above screen was taken from the Microsoft web site of September, 2007.) This update program (KB885222) cannot be installed by Microsoft auto-update. A manual installation must be done.

Now the installation of the 1394 Storage Supplement Program has been completed. Next, proceed to "Installing LX Navi".

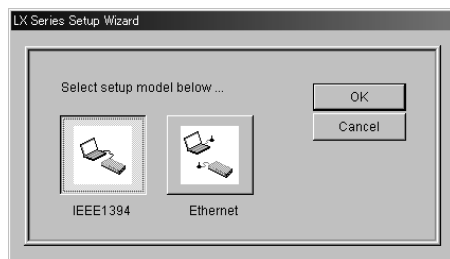
※When using Windows XP(SP2), the cautions will be displayed by starting LX Navi without having installed this update program. There is no need to install the update program when using an OS other than Windows XP (SP2)

Installing LX-100 Series (IEEE 1394 model)

Installing LX Navi

To install the supplied LX Navi software:

1. Execute "Setup.exe", which is in the supplied CD-ROM.
2. Follow the instructions displayed and proceed with the setup.



Click **IEEE1394** at the dialog box that will appear in the middle of the installation when using IEEE 1394 model and, then, click **OK**.

3. After installation, restart the PC.

Installing LX-100 Series (LAN model)

An overview of the LX-100 (LAN model) installation is provided below.

1. Install LX Navi.
2. Set the IP address of the PC to be connected and the LX-100.

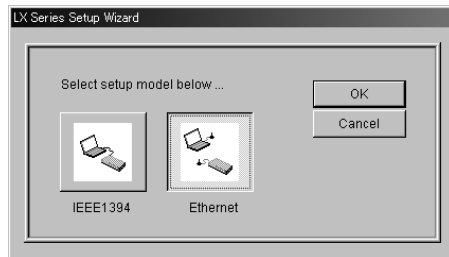
■ Use an on-board type 100BASE-TX LAN interface of your PC.

One-to-one connection with LX-100 using a cross cable

Installing LX Navi

To install the LX Navi software supplied:

1. Set the supplied CD-ROM to CD/DVD drive. The program installation of the LX-100 Series will start to run.
If the program will not run, execute "Setup.exe" in the CD-ROM.
2. Follow the instructions displayed and proceed with setup.



Click **Ethernet** at the dialog box that will appear in the middle of installation when using the LAN model and, then, click **OK**.

3. After the installation, restart the PC.

About IP Address Settings

Consult your network administrator when connecting the LX-100 series to your network per the following information. Basic knowledge about the Windows network system is required to set the network connection parameters.

■ The default settings of the LX-100 Series are as follows. Modify the settings (such as the IP address) as necessary. How to change: Click the portion of the IP address in LX Network dialogue to display LX Property dialogue. You can create settings for parameters of the IP address or recorder name (Name). (For detail of the settings, refer to the next item of "Starting Program")

IP address: 192.168.0.10

Subnet mask: 255.255.255.0

Gateway: 0.0.0.0

DHCP client: DISABLE

■ To communicate at 100 Mbps, all devices in the path from the LX-100 to the controller PC must support 100 Mbps. Use a cable that is Category 5 or better. To ensure communication quality, we recommend that you use STP cables and a switching hub that supports STP cables.

■ Depending on the network environment being used, it is possible that you will encounter delays in data transmission or congestion in processing. In such a case, try the following to improve the situation:

- 1) If a repeater hub is being used, change to a switching hub instead.
- 2) Reduce the number of broadcast packets as much as possible.
- 3) Use a communications path that does not pass through a router as much as possible.

■ However, in a situation such as when the LX-100 is in a remote location and communications are constrained by low-speed paths, use the LX-100 with a reduced sampling rate.

■ The LX-100 LAN interface carries out TCP connection continuous communications. However, if a packet from the other party does not arrive within 180 seconds, a timeout occurs and the other party is automatically disconnected. So, in the event that a normal termination was not possible because of some problem, such as a PC hang-up or disconnected cable, wait 180 seconds and then try reconnecting.

■ If the PC enters a standby status while LX Navi is being used, communications will cease, and a timeout will cause a disconnection. If you are using the PC for a long time, make sure that the system standby setting in the Windows power options is not selected.

■ With the LX-100 LAN interface, the LX-100 can be operated as a DHCP (Dynamic Host Configuration Protocol) client, but if an IP address cannot be obtained within 30 seconds after startup, the LX-100 starts those usual operations with a fixed IP address.

■ If you establish a firewall on your PC or install virus check software, you may not connect the LX. Check the security level of the program on your PC. The ports to be used at LX Navi (LAN model) are as follows:

Control port	49408 (TCP)
Data transfer port	49664 (TCP)
UDP port	49920 (UDP)

For other settings, such as IP address parameter settings and network usage, consult your network administrator before using the LX-100.

Starting Program

After installing the drivers and LX Navi and connecting the PC and the LX, start LX Navi.

- Do not run LX Navi together with application software that uses a lot of memory.

To start LX Navi:

1. On the LX-100 main unit, push up the power switch to |.

When the power is turned on, the input amp is automatically calibrated. During calibration, the input amp LED will blink. When it finishes, the LED will turn off.

Then, the input amp LED turns off.

2. Start LX Navi.

After LX Navi starts, if you power off the LX-100 main unit or remove the IEEE 1394 cable, LX Navi will display an error message and terminate. In such a case, if you turn the power back on or reconnect the cable, and then restart LX Navi, the LX-100 can again be recognized.

In the case of the LX-100, if you power off the LX-100 main unit or remove the LAN cable, not only will communications fail, but also the network will experience congestion in processing. Make sure to close LX Navi first to detach the LX-100 from the network. Do not power off the LX-100 before closing LX Navi.

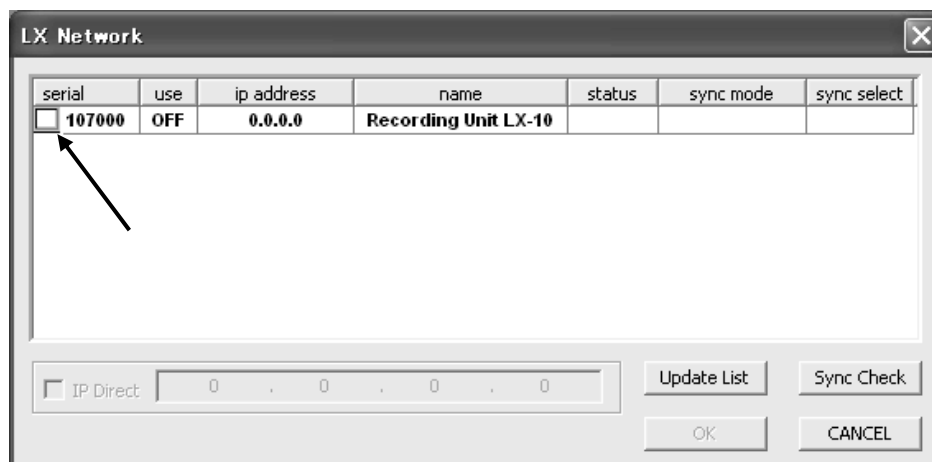
- It is taking an excessively long time for the LED to turn off.

After you power on the main unit, if it takes an excessively long time for the input amp LED to turn off, the amp may not have been recognized. In that case, turn the power on again.

- Do not put the PC into sleep mode.

Set your PC's sleep mode to OFF. If the PC goes into sleep mode, an error will occur on the LX Navi. Make sure the system standby setting in the screen saver or Windows power options is not selected. Note that some notebook PCs automatically go into sleep mode just by folding the display.

For LX-100 Series (IEEE 1394 model)

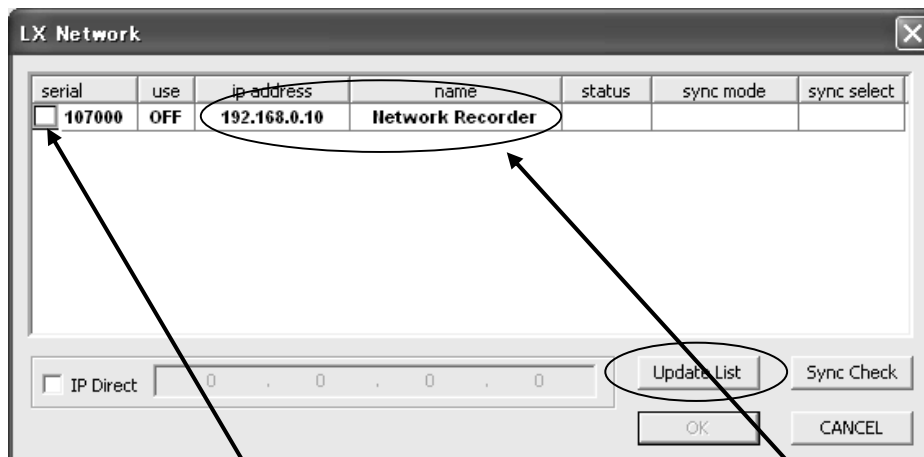


Check the box at the **serial** field of the **LX Network** dialog box by confirming that the correct serial number is displayed, and then click **OK**. In addition, a previously used serial number will automatically contain a check in the box.

Starting Program

For LX-100 Series (LAN model)

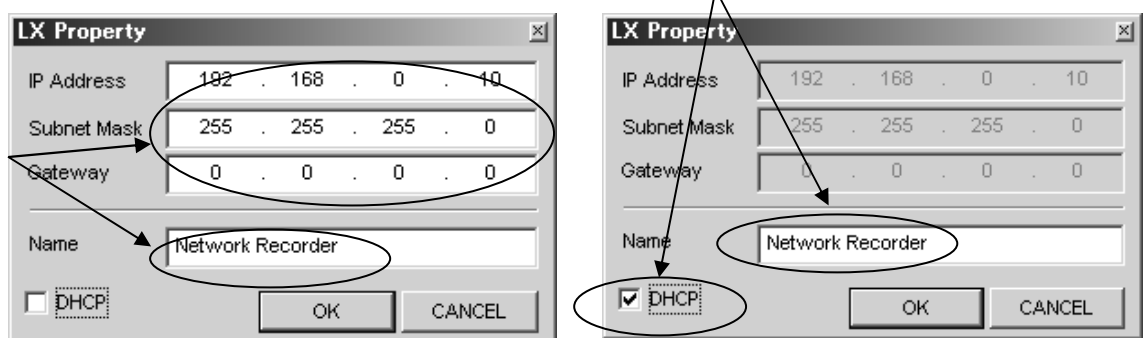
The following dialog box is displayed when LX Navi starts.



Check the box at the **serial** field **LX Network** dialog box by confirming that the white-out box has appeared and the correct serial number are displayed, and then click **OK**. In addition, a previously used serial number will automatically contain a check in the box.

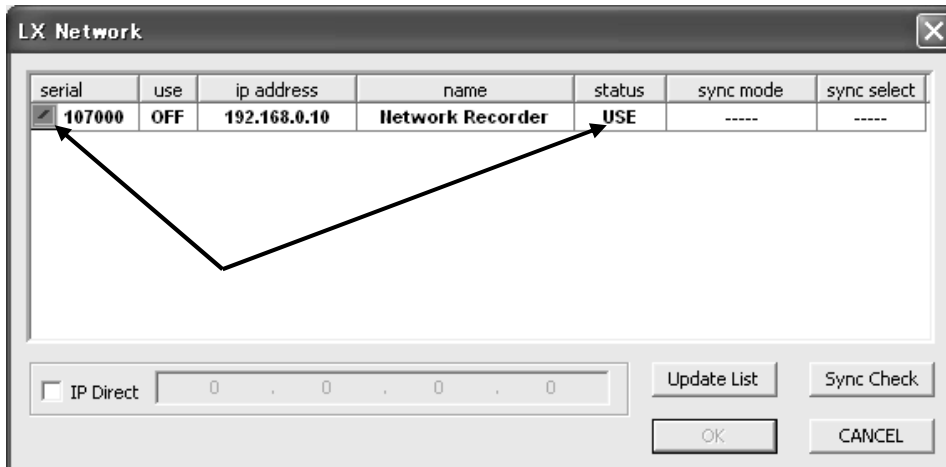
If the whiteout box has not appeared, follow the next pages for a proper set up.

The upper part lists the LX-100 series that exist in the same segment. If you click where the **IP address** or the **name** is displayed in the list area, the **LX Property** dialog box will appear. In this dialog box, you specify settings, such as the IP address parameters and the recorder name (**Name**). Enter the address parameters that match the network environment that you are using. For **Name**, you can use any string of up to 32 characters. This name is displayed in the list at startup. So, use a name that differentiates the particular LX-100 series from any others. If the DHCP system is available for the network environment that you are using, the **IP Address** parameters can be obtained automatically. So, in case that you want to set the **IP Address** parameters automatically, turn on the check box of the **DHCP**. Consult your network administrator to confirm whether or not the DHCP system is available for the network environment that you are using.

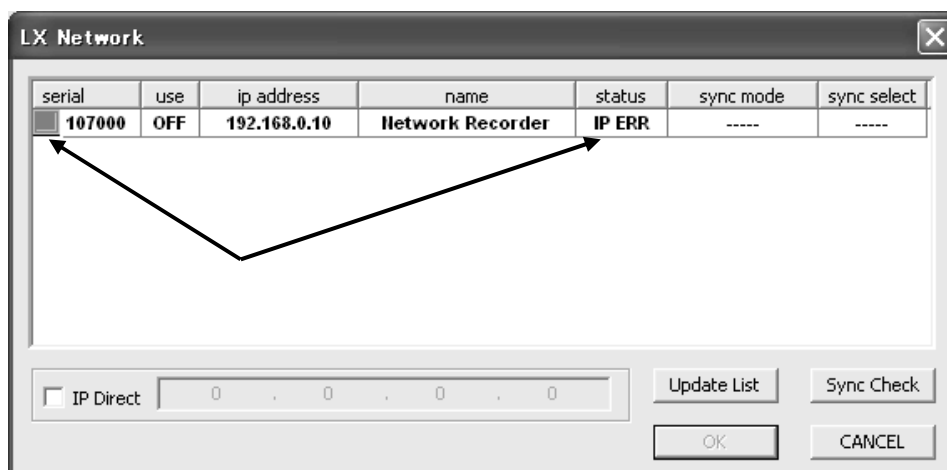


Click the **OK** button to apply the IP address parameters for the LX-100 series. It is not necessary to restart the LX-100 series. It takes a few seconds for the changed settings to actually take effect. So, wait at least 5 seconds and then connect to the LX-100 series. If the list is not updated or the entry disappears from the list, click the **Update List** button to update the list.

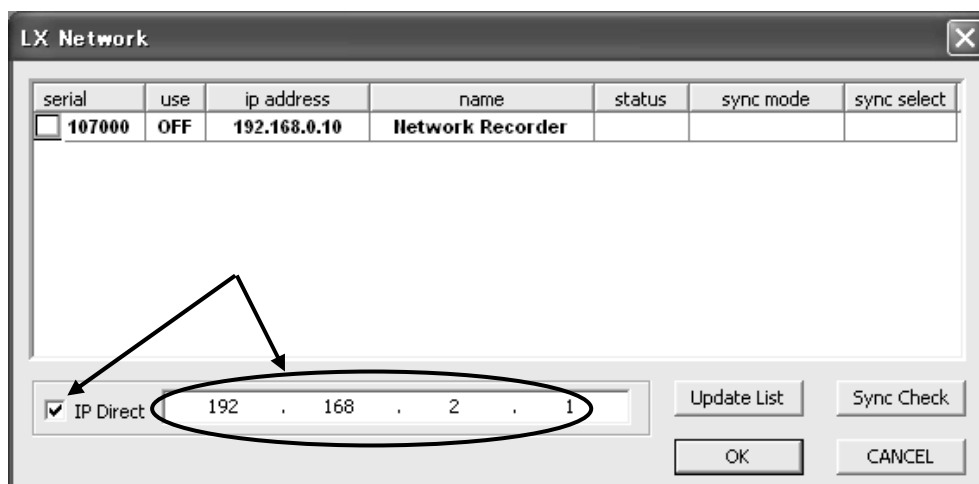
Note that if the LX-100 series is already being used for another PC, a red check mark is displayed and **USE** is displayed in the **status** field. In such a case, you cannot connect to that LX-100 series.



If a TCP connection is not possible because of a problem such as an incorrect IP address for the same segment, a grey check box will be displayed along with **IP ERR** in the **status** field. In that case, specify an appropriate IP address or check the IP address settings (Subnet mask, Gateway, etc.) between the PC and the LX-100, and then connect to the LX-100 series.

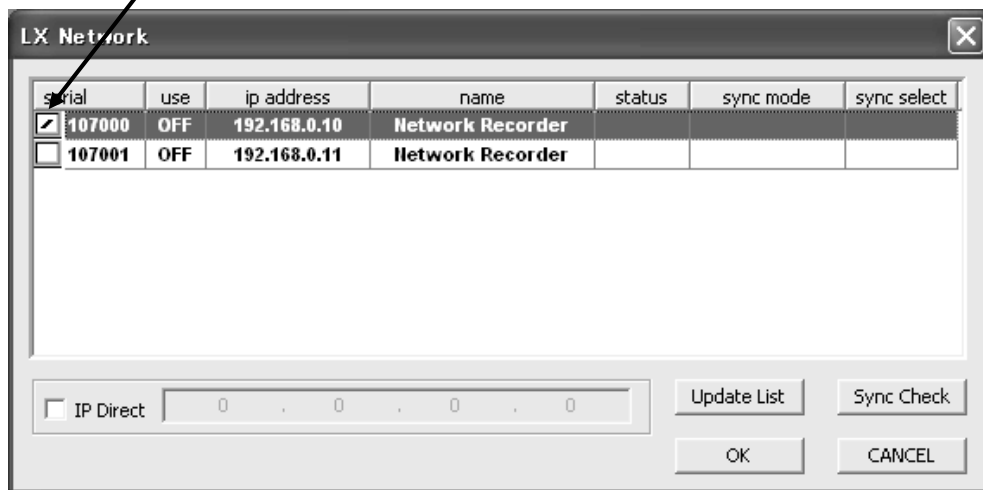


When connecting to an LX-100 series that exists in a different segment (and, for example, going beyond the router), select the **IP Direct** check box, enter the address of the device to be connected, and then click **OK**.



Starting Program

When multiple LX-100 series are found in the same segment, the dialog box appears as shown below. In such a case, select the check box of the LX-100 series to be connected, and click the **OK** button.



On a real time PC recording of the LX-100 series (LAN model), the speed of the data transfer cannot catch up to the recording throughput a time unit. In this scenario, the recording will stop automatically when the memory buffer of the LX becomes full with un-transferred data. It is caused by depending on the PC specifications and the network traffic. However, the following sampling setting is not applicable for the real time PC recording.

Sampling Frequency 96 kHz x 8 ch (Memo voice ON/OFF)

If, by using LX Navi, multiple LX units are connected to a single PC (with IEEE 1394 or LAN), the waveform settings and the data folder settings of each LX may conflict with others because the LX Navi shares the common save area. So that every PC has its own LX within a multi environment, use a separate PC for each LX.

The Main Window will be displayed by starting LX Navi when the connection is completed.

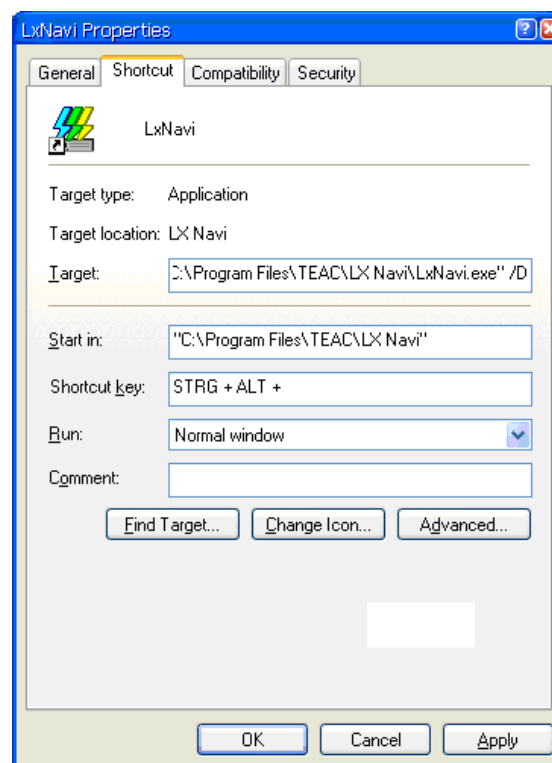
See "Section 3 Introduction to LX Navi".

Start to run Navi directly without displaying the LX Network dialogue

When running LX Navi, refer to the following procedure and specify "/D" option. If the LX with the serial number, which has been started previously, is connected to the I/F, LX Navi will start to run directly without displaying LX Network dialogue. If the LX with serial number, which has been started previously, is not connected, LX Network dialogue will be displayed. If the only LX with serial number, which has been started previously, is connected to the I/F, LX Navi will start directly without LX Network dialogue. In such a case, specifying "/D" option is not required. To display the LX Network dialogue without exception, start the program by pressing "Shift key".

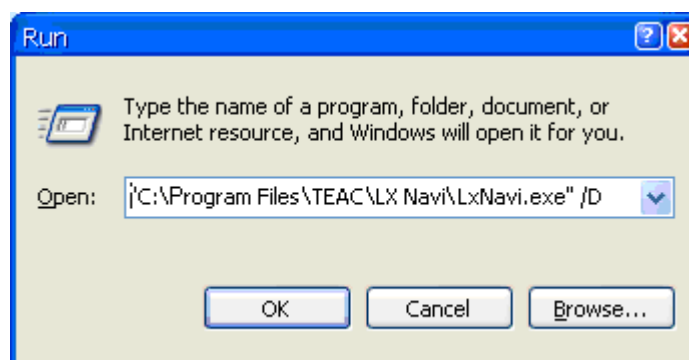
(Example 1) Open the property of the LX Navi short cut icon and add " /D" option to the path of link destination as follows.

Link destination "C:\Program Files\TEAC\LX Navi\LxNavi.exe" /D



(Example 2) From the [Start] menu select [Run] and enter the directory path and "LxNavi.exe" with "/D" option to execute as follows and click the [OK] button.

Name "C:\Program Files\TEAC\LX Navi\LxNavi.exe" /D



Inserting and Ejecting Media

Inserting and Ejecting Media

Inserting Media

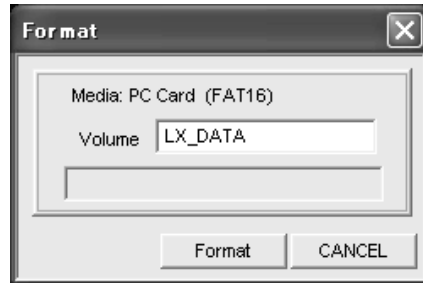
- Insert or eject the media when the LX is at the STOP state of the REC mode.
- To discharge static electricity from your body, touch a metallic surface near you before handling the unit. Never touch the PC card being inserted in the PC card slot while recording and replaying.

1. Power on the LX main unit. Wait until the STOP lamp glows before proceeding to the next step.
2. Open the cover of the drive.
3. Insert the media, with the label facing up, into the slot.
4. Close the cover of the drive.

- To ensure the recording performance of the main unit, use the PC cards specified in "Notes on Usage" of Section 1 "Preface".

PC Card

On the PC, format the PC Card to FAT16 or FAT32 (not quick format) before using. Format the PC Card exceeding 2GB to FAT32. (The format operation from the File menu of LX Navi is a quick format.) Type the volume name and then click **Format**.



Ejecting Media

- Turn off the power after you eject the media

Remove the media before powering off the LX. If the power is turned off during writing, the data recorded on the media might become unreadable. Also, eject the media before moving the LX main unit. Moving the unit while the media is inserted might result in damage.

- Insert or eject the media when the LX is at the STOP state of the REC mode.

- To discharge static electricity from your body, touch a metallic surface near you before handling the unit. Never touch the PC card being inserted in the PC card slot while recording and replaying.

1. Open the cover of the drive.
2. Push the eject button to eject the PC Card.
3. Remove the media.
4. Close the cover of the drive.

- You cannot remove the media during recording or reading. The data will be corrupted.

About Data on Media

In a PC's drive, the data recorded on a media can be recognized as files in TAFFmat format. Therefore, the files can be read by commercially available analytical software. If you perform a file operation such as moving, deleting, or renaming a file or folder on the PC, the link between the data file and the header file might be lost, and the data might become unreadable on the PC. You should do no file operation except copying files.

About Expansion Unit

About Expansion Unit

The combinations of input amp and output amp available for using AU-LX100EPIO expansion unit are as follows.

16 inputs + 16 outputs

(From the upper slot to the lower)

Slot 1: Input amp

Slot 2: Input amp

Slot 3: Output amp

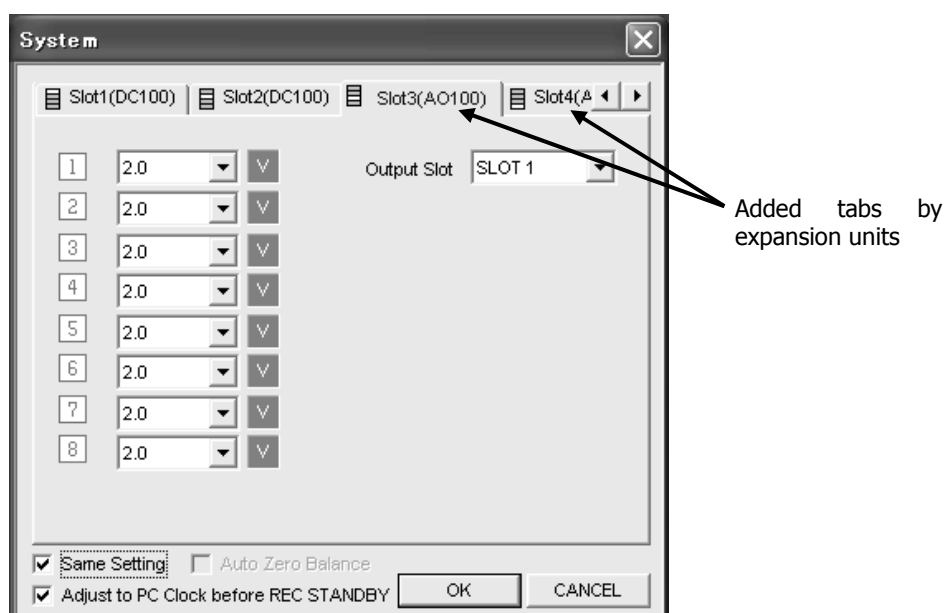
Slot 4: Output amp

32 inputs

Install input amps into all slots.

About Slot Settings

When the expansion unit is added, tabs are added to the System dialog.



About Maximum Sampling Frequency When Using an Expansion Unit

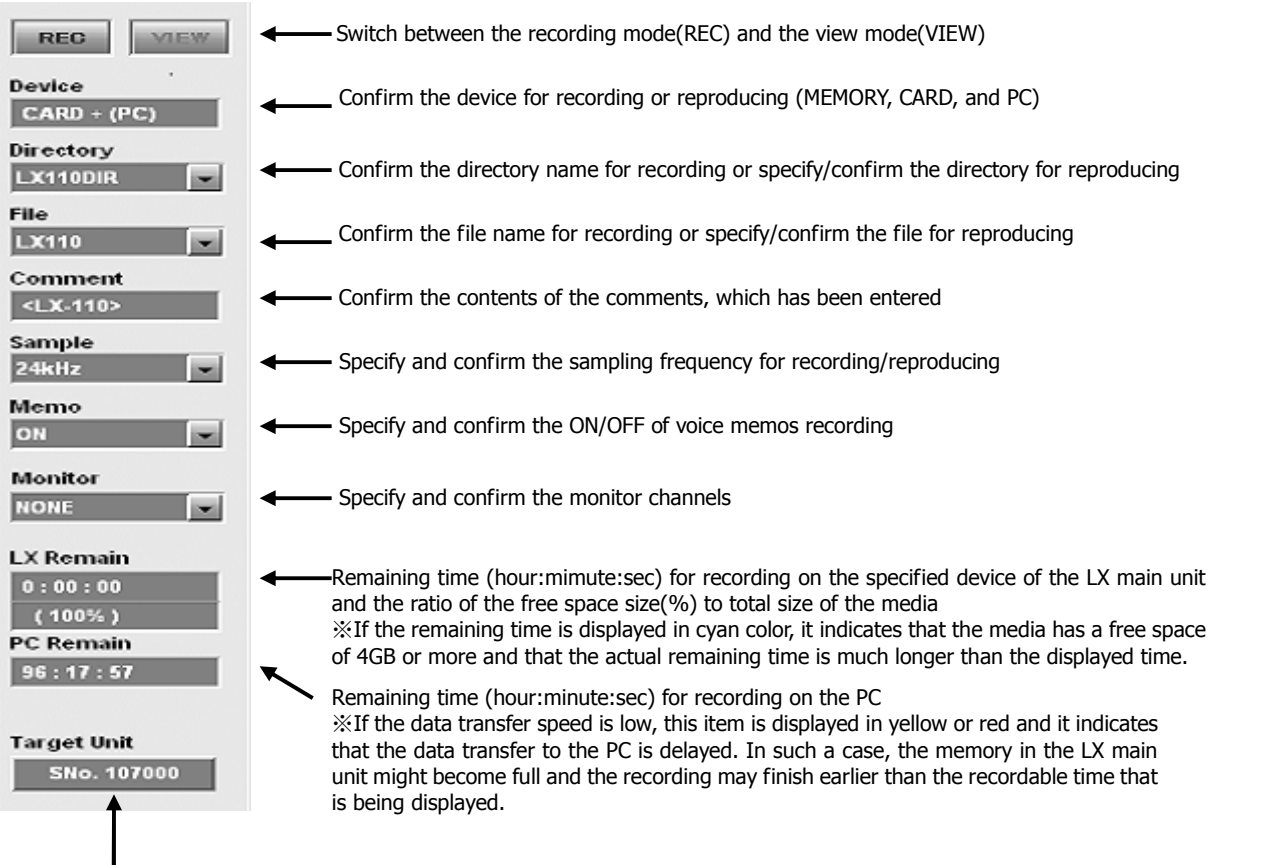
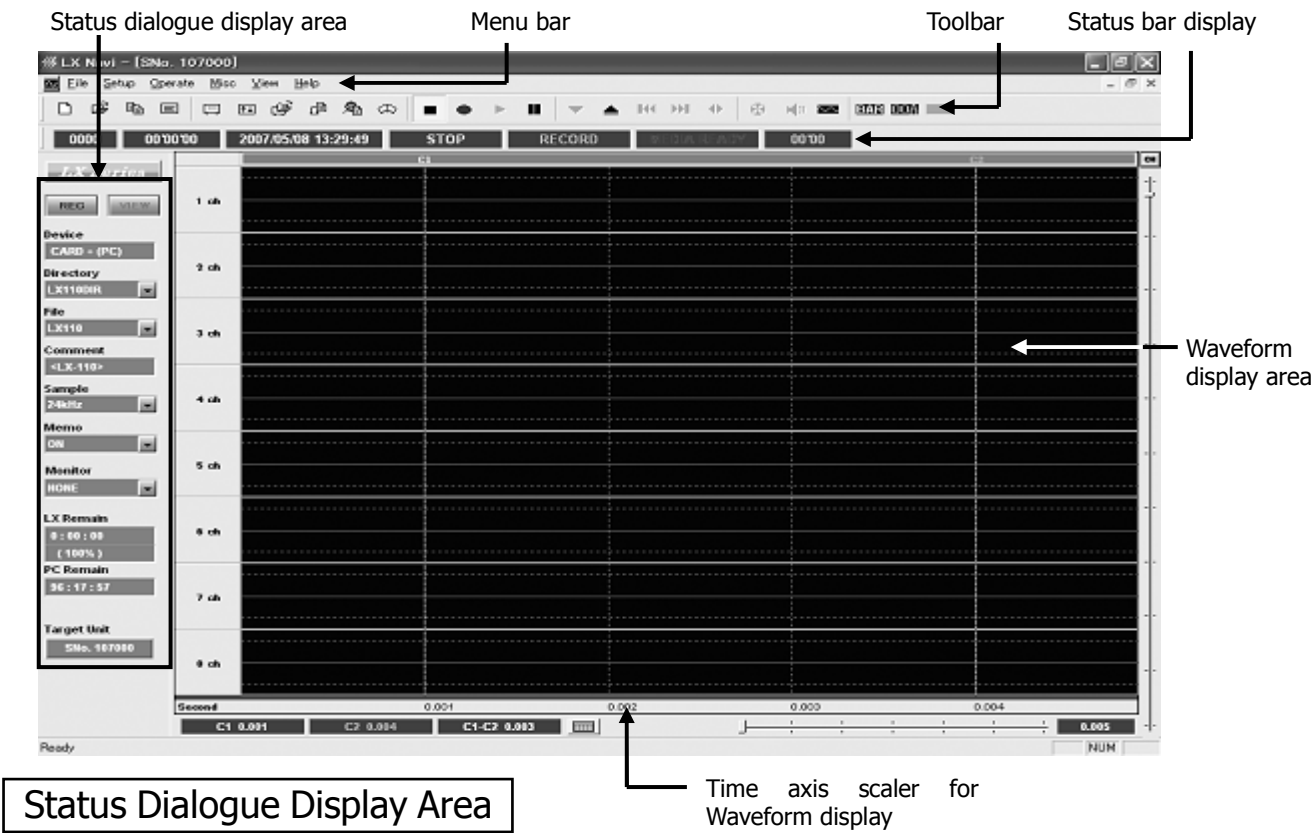
AD data length	Channels	Memory Recording	Media Recording (PC card)
16bitsAD	2 ch	96 kHz	96 kHz
16bitsAD	4 ch	96 kHz	96 kHz
16bitsAD	8 ch	96 kHz	48 kHz
16bitsAD	16 ch	48 kHz	24 kHz
16bitsAD	32 ch	24 kHz	12 kHz
24bitsAD	2 ch	96 kHz	96 kHz
24bitsAD	4 ch	96 kHz	48 kHz
24bitsAD	8 ch	48 kHz	24 kHz
24bitsAD	16 ch	24 kHz	12 kHz
24bitsAD	32 ch	12 kHz	6 kHz

Section 3 Introduction to LX Navi

Outline of Main Window

Outline of Main Window

When you start the LX Navi program, the following main window will be displayed.



Menu Bar

File Setup Operate Misc View Help

Main Menu

File	
New	Ctrl+N
Open...	Ctrl+O
Copy...	Ctrl+C
Format...	Ctrl+F
Exit	

New: Select a recording device, or specify a file name

Open: Select a data to be reproduced

Copy: Copy a data

Format: Format a media

Exit: Exit application

Setup	
System	
Trigger	
Params Property	
TEDS Property	
Channel Unit	
Zero Balancing	

System: System settings of operation, recording conditions, and reproducing conditions

Trigger: Settings of a trigger action

Params: Property: Save and Load parameters

TEDS Property: Load TEDS Property

Channel Unit: Auto offset
Calibrations

Zero Balancing: Zero balance

Operate	
Stop	(F5)
RecStandby	(F6)
Rec/Play	(F7)
Pause	(F8)
Event	(F9)
Eject	
Back	
Next	
Search Property	

Stop: Stop

RecStandby: Recording standby

Rec/Play: Record / Reproducing start

Pause: Pause

Event: Write event mark

Eject: (Eject)

Back: Skip to previous

Next: Skip to later

Search Property: Setting of skip

Misc	
Fan	
Speaker	
Amp Calibration	

Fan: Stop a fan forcibly (On/Off)

Speaker: Reproduce a data by sounds (On/Off)

Amp Calibration: Execute Calibration

View	
Bar	
Digit	
Hdr	
✓ Toolbar	
✓ Status Bar	

Bar: Display/Non-display of a Bar graph

Digit: Display/Non-display of a Digital value

Hdr: Display/Non-display of reproducing a header

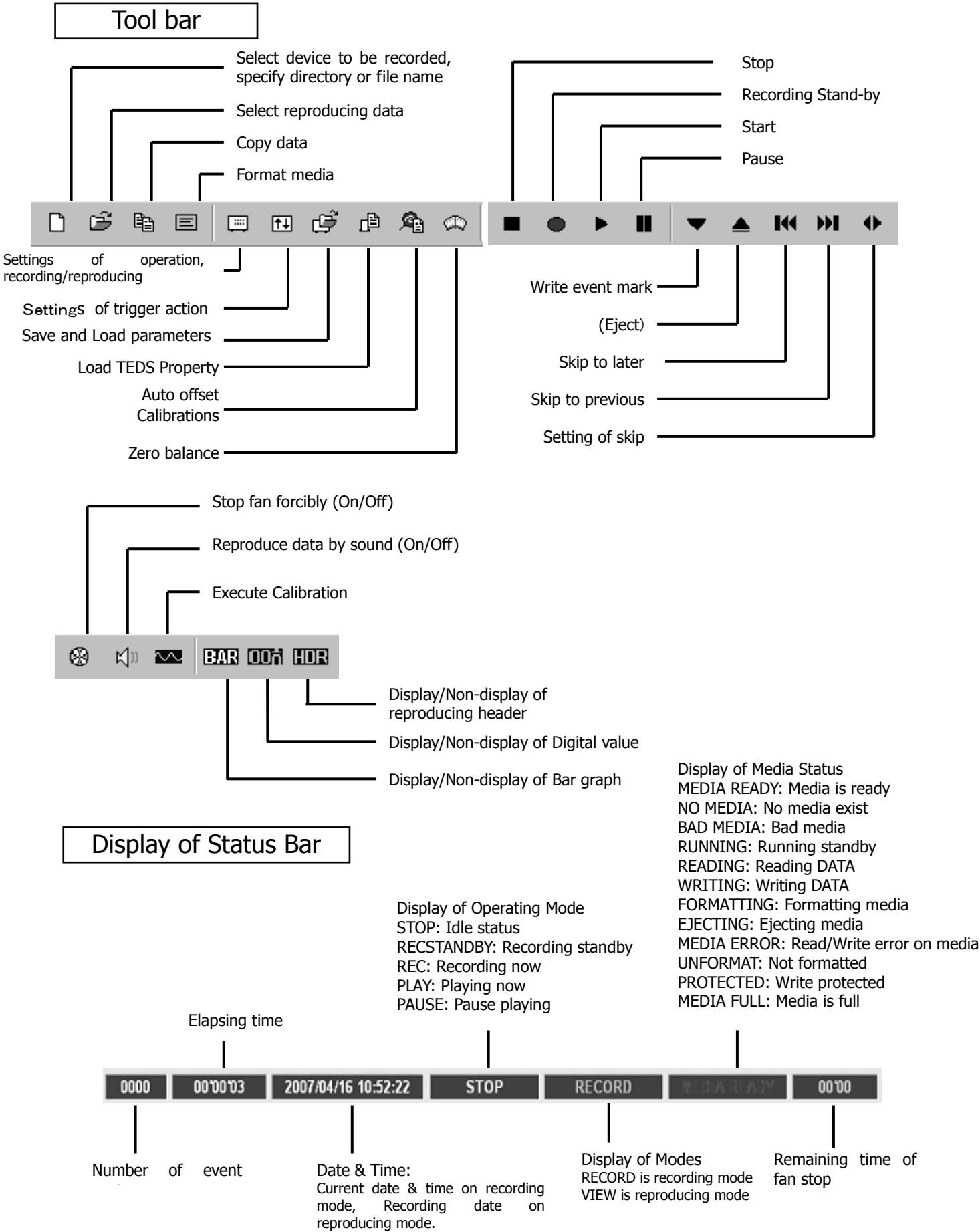
Toolbar: Display/Non-display of a Tool bar

Status Bar: Display/Non-display of a Status Bar

Help	
About LXNavi...	

About LXNavi: Help (the information of the current version)

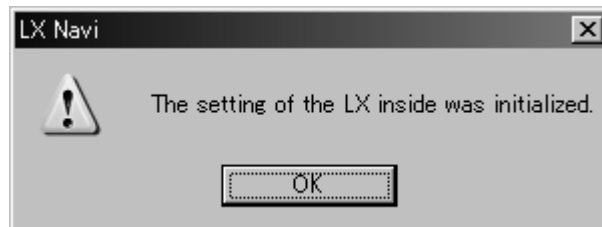
Outline of Main Window



Display of Status Bar

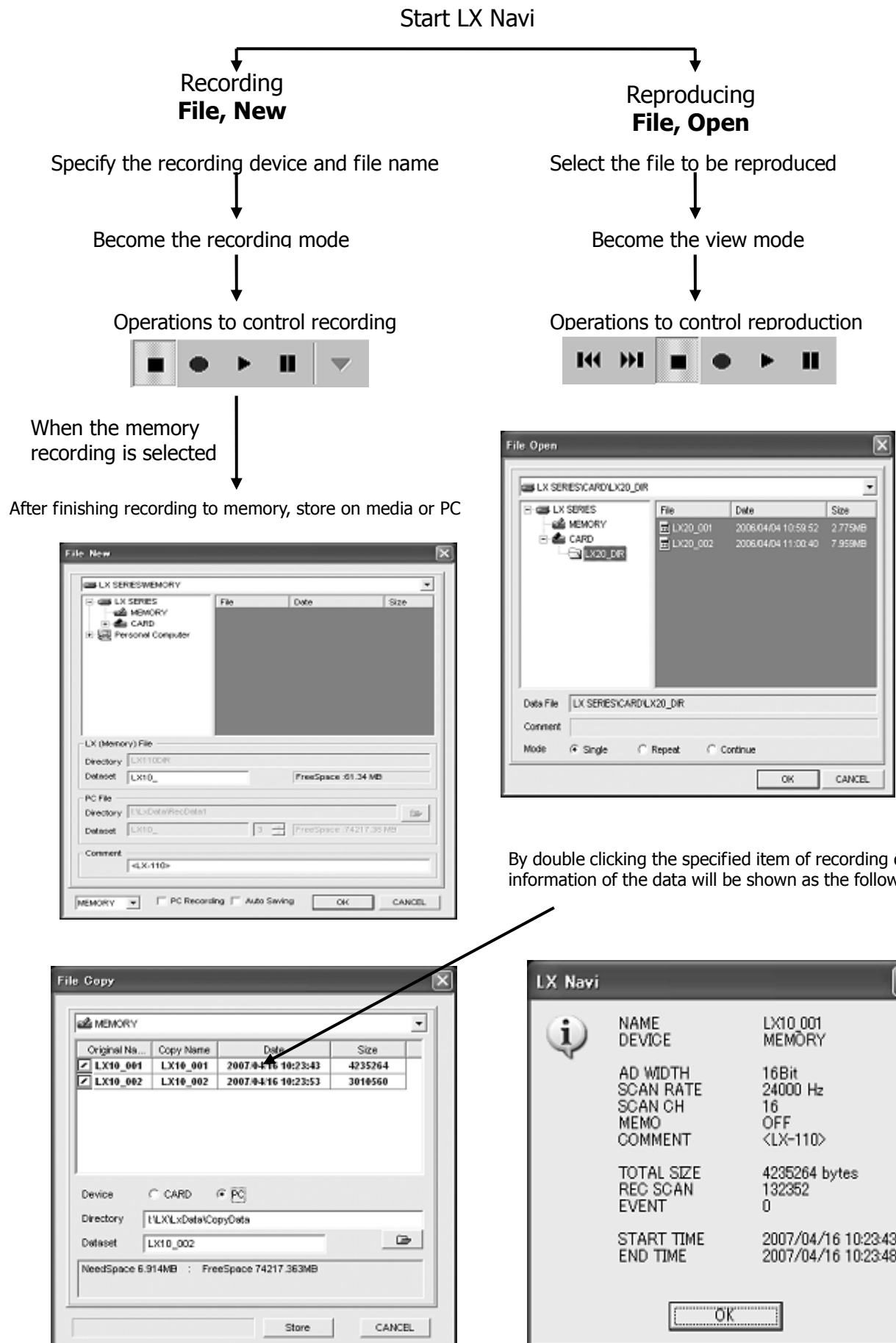
Initializing Settings

In case the setting parameters, which are saved in the LX main unit, are initialized, such as changing the amp configuration of LX, the following message will be displayed. In such a case, confirm the settings and change them.



Overview of Steps in Recording and Reproduction

Overview of Steps in Recording and Reproduction

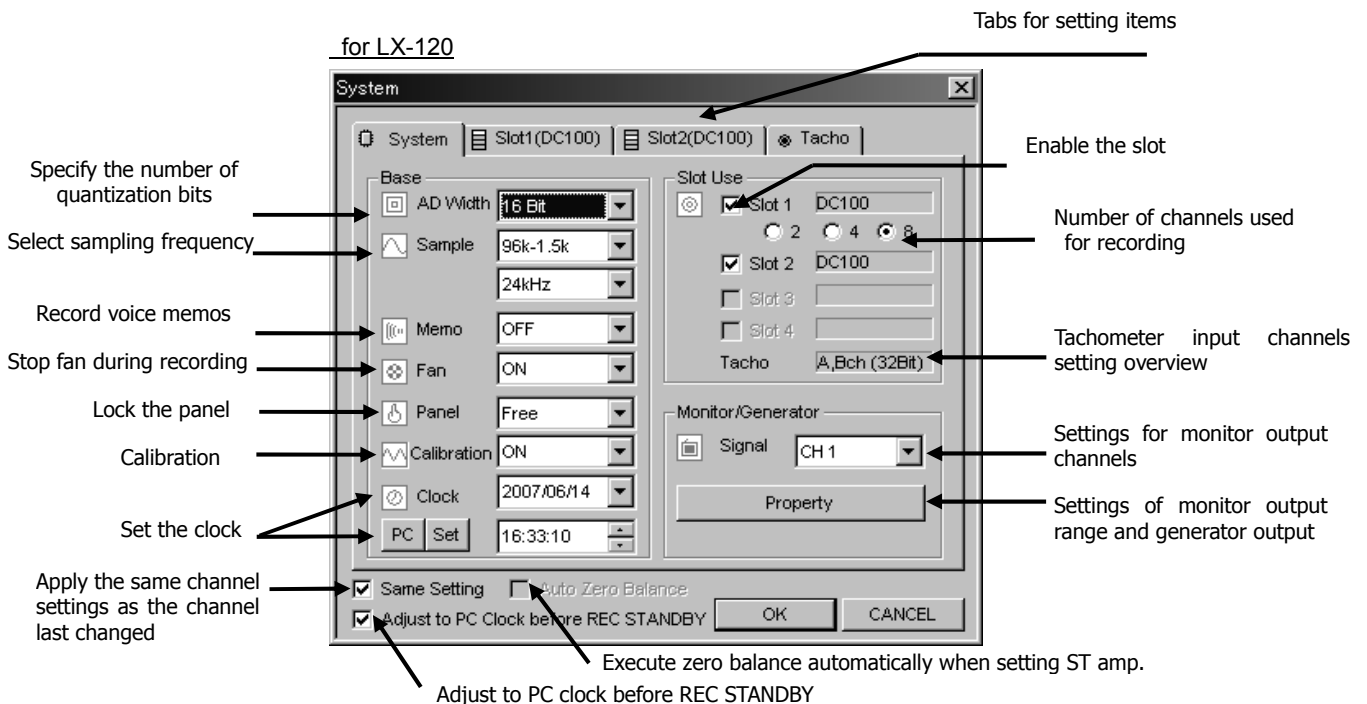
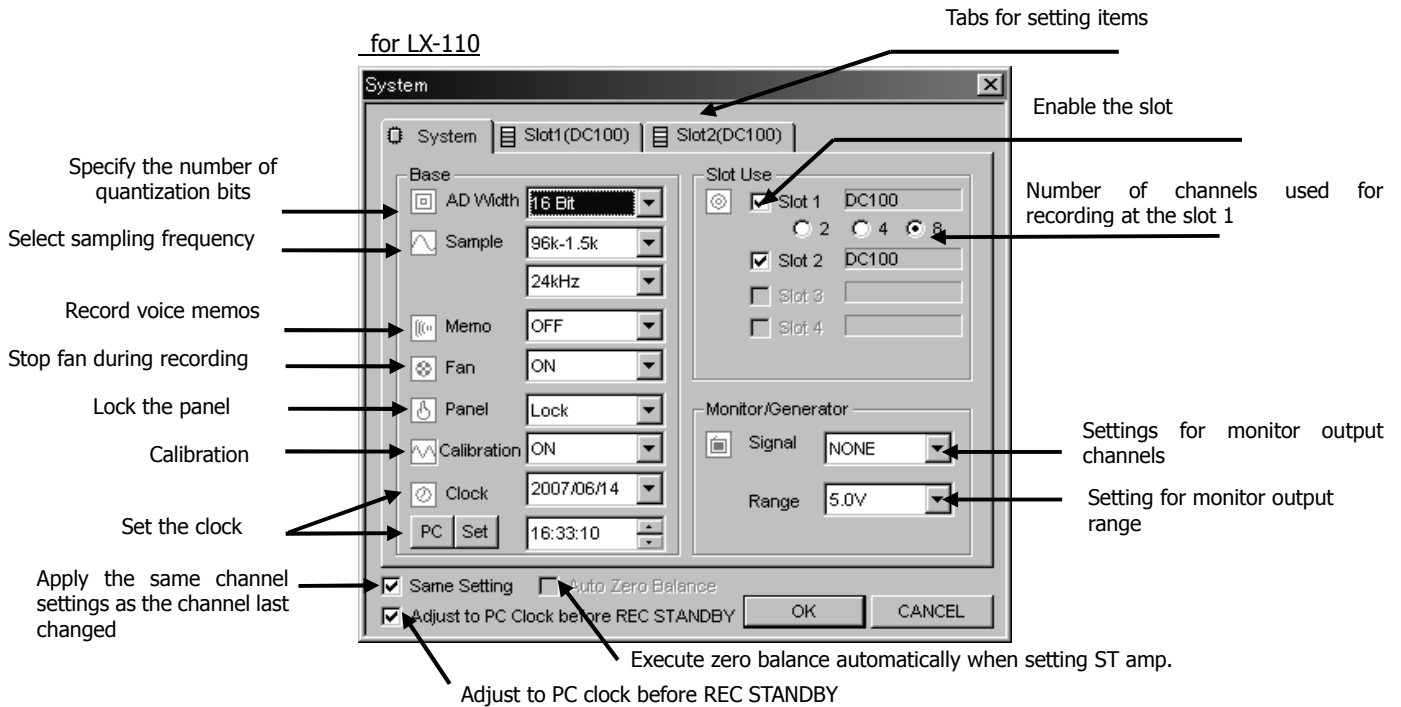


Section 4 Settings

System Settings

System Settings

To specify settings of the LX operations, choose **System** from the **Setup** menu.

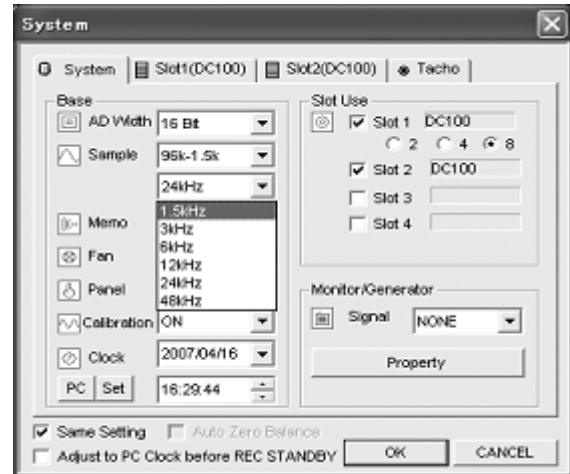


AD Width

Select either of 16 bits or 24 bits as a quantization bits.

Sample

Select the sampling frequency. Select the sampling frequency series, including the sampling frequency to be selected at the upper row. Then, select the sampling frequency within the list shown at the lower row. They are to be limited, based on the selected recording media and the tachometer pulse input channels. See "Sampling Frequency and Number of Channels" on page 1-13.



or LX-110

In LX-110, you can select the sampling frequency series of 96k-1.5k and 1k-1/60 only at the upper row. You also can set a sampling frequency of 96 kHz, 48 kHz, 24 kHz, 12 kHz, 6 kHz, 3 kHz, or 1.5 kHz in 96k-1.5k at the lower row and set one of 1 kHz, 500 Hz, 200 Hz, 100 Hz, 50 Hz, 20 Hz, 10 Hz, 5 Hz, 2 Hz, 1 Hz, 1/2 Hz, 1/5 Hz, 1/10 Hz, 1/30 Hz, 1/60 Hz in 1k-1/60.

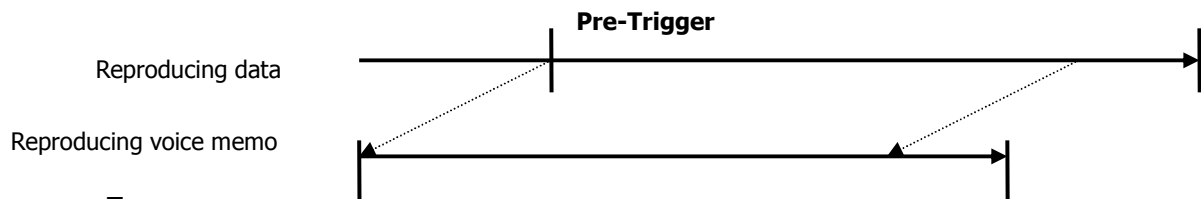
for LX-120

In LX-120, in addition to 96k-1.5 and 1k—1/60 series, you can select another sampling frequency from the following: 100k-1k (100 kHz, 50 kHz, 20 kHz, 10 kHz, 5 kHz, 2 kHz, or 1 kHz) 102.4k-1.28k (102.4 kHz, 51.2 kHz, 25.6 kHz, 12.8 kHz, 5.12 kHz, 2.56 kHz, or 1.28 kHz) 65.536k-1.024k (65.536 kHz, 32.768 kHz, 16.384 kHz, 8.192 kHz, 4.096 kHz, 2.048 kHz, or 1.024 kHz)

Memo

Set to ON when recording or reproducing a voice memo. Voice memo data is recorded as a voice memo file separately from the data and header files, using 8,000 bytes per second. Note that this data increases even when the microphone has been removed from the jack.

- In case both of the media (Memory or Card) and the PC are specified as a destination of recording and setting ON at the recording of voice memo, the data file of voice memo is created on the media of the LX main unit only, not on the PC.
- A voice memo is not recorded during the pre-trigger period. In playback, the voice is replayed from the beginning of the data. So, the voice and data are not synchronized.



Fan

When you set this to **OFF**, you can stop the cooling fan on the LX-100 for a period of 10 minutes from the start of recording. This is useful for recording noise. If you have already stopped the fan and recorded data, wait for about 10 minutes before you again stop the fan and record.

When you set this to **ON**, the cooling fan is turned to on. However, by clicking the fan stop button on the toolbar, you can stop the fan while recording. Click again to restart the fan. An accumulated time to stop the fan within a single recording (from recording start to stop) is 10 minutes. The remaining time to stop the fan is displayed at the status display. (See "Display of Status Bar" on page 3-4.)

Panel

When you set this to **Lock**, you can disable the control buttons on the front of the main unit.

System Settings

Calibration

When you set this to **ON**, the calibration will start automatically.

Clock

Use this to adjust the internal clock on the main unit. The current date and time according to the internal clock are displayed here. To change the date, click the ▼ button on the right of the date. A calendar will appear. In the calendar, click the desired date. To change the time, click the digits you want to change and then either type the desired time or click the ▲ or ▼ button on the right of the time to increase or decrease the time value. After you have changed the date or time values, click **Set** to apply the new settings. Click **PC** to set the date and time of the PC connected.

Slot Use

Turn on a check box to enable the corresponding slot to be used for recording or reproduction. For Slot 1, you can choose the number of channels to be used for recording from 2, 4, or 8.

Use the slot tab of the **System** dialog for the settings of the input and output amps enabled here.

At the LX-120, turn on the **Tacho** check box to enable the tachometer pulse input channels.

■ You cannot use the tachometer pulse input channels and the generator output function at the same time.

Same Setting

In case it is necessary to set amp for each channel, turn on the check box to apply the same settings to the channels as the channel last changed.

Auto Zero Balance

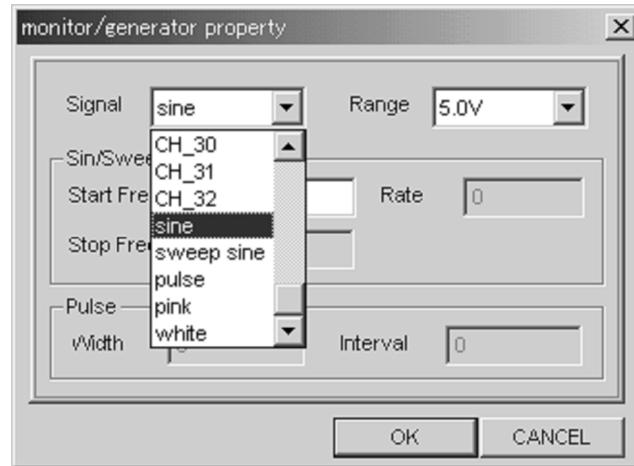
In case a ST amp is installed, turn on the check box to start the zero balance automatically after settings

Adjust to PC Clock Before REC STANDBY

Turn on the check box to set the time of the LX main unit according to the PC

Monitor/Generator

In **Signal**, select the monitor channel or the type of the generator output signals (only for the LX-120) to be output from the MON OUT connector on the rear panel. If you don't want to monitor any channel, set NONE. Click **Property** to set the output range of the monitor channel or the details of the generator output signal.



In **Signal**, select the monitor channel or the type of the generator output signals (sine, sweep sine, pulse, pink noise, or white noise from the MON OUT connector of the LX-120).)

When you select the generator output signal, you can select the following parameters that appear at the dialog. (The parameters that can be set appear automatically, depending on the selection of the output signal.)

Sin/Sweep

Start Freq: Set the start frequency (Hz) in the range of 0 to 43000(Hz) when <sine> or <sweep sine> is selected at **Signal**. However, the upper limit of the monitor output frequency is 1/2.4 of the sampling frequency.

Stop Freq: Set the sweep stop frequency (Hz) in the range of 0 to 43000(Hz) when <sweep sine> is selected at **Signal**. However, the upper limit of the monitor output frequency is 1/2.4 of the sampling frequency.

Rate: Set the sweep rate (Hz) in the range of 0 to 80(Hz) when <sweep sine> is selected at **Signal**. If the value is too much, it might take a long time for monitor output of the frequency specified at **Start Freq** and **Stop Freq**.

Pulse

Pulse Width: Set the pulse width in the range of 0 to 65535(msec) when <pulse> is selected at **Signal**.

Pulse Interval: Set the pulse interval in the range of 0 to 65535(msec) when <pulse> is selected at **Signal**.

You can set output range in **Range**. You can select the output range of 1 V to 5 V in 0.1 V steps.

See Section 6 for the specifications of the generator output.

- You cannot use the tachometer pulse input channels and the generator output function at the same time.
- You cannot use the monitor output of the analog signal when recording at the low-speed sampling series (1 kHz to 1/60 Hz).
- The available frequency of sine or sweep sine for generator output is 1/2.4 of the sampling frequency.

Input Amp Settings

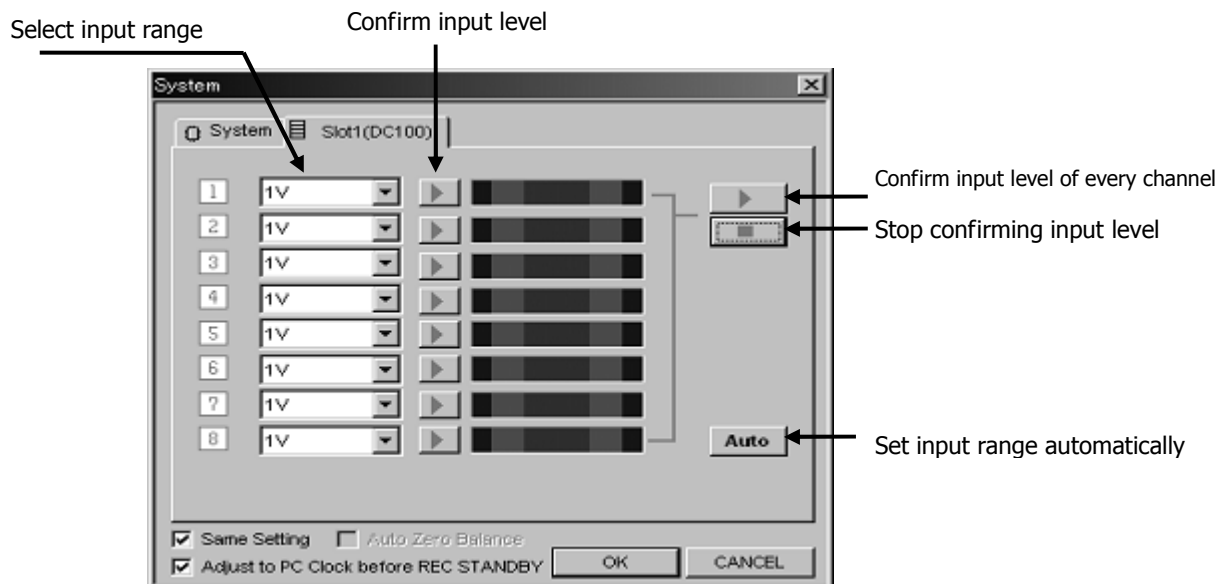
Input Amp Settings

In the **System** dialog, click the tab of the slot in which the input amp is installed.

The setting parameters are valid, depending on the type of the amps installed.

DC Amp AR-LXDC100

<DC100> is shown at the **Slot** tab. See Section 6 for the specifications.



Range Settings

You can select the value from ± 0.5 , 1, 2, 5, 10, 20, 50 V. A range of $\pm 131\%$ of the selected range can be obtained for AD (analog to digital) conversion value. However, the input margin level is approximately $\pm 120\%$. Select a value so that the input does not exceed $\pm 120\%$. Input signal, and create the setting by clicking the right ► button to check the level.

Auto

When you input the signal and click **Auto**, the optimum input range is set automatically.

PA Amp AR-LXPA100


<PA100> is shown at the **Slot** tab.

AR-LXPA100 is a PA amp applied for some inputs such as voltage output accelerometer, etc.

See Section 6 for the specifications.

Cautions on Using PA Amp

■ Calibration

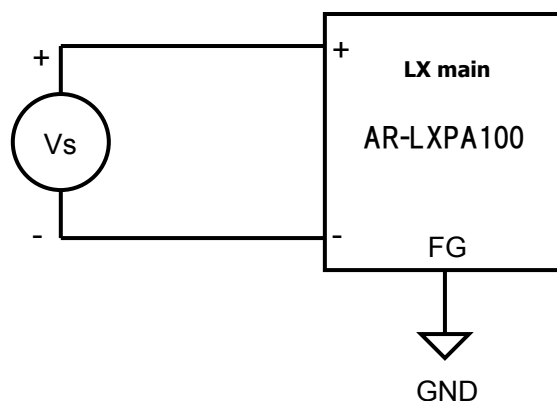
It is suggested that you use the 0.01 V range of the LX PA amp after turning on the power for 10 minutes or more, and then executing manual calibration. In order to execute the manual calibration for precise measurement, click the  button on the toolbar of the LX Navi. Also it is recommended that you use the balanced input mode for precise measurement. Also, the balanced input mode is recommended for precise measurement.

■ Input Connection and Grounding

When using a battery-powered sensor or IEPE sensor

Input Mode: Balanced (Bal) mode

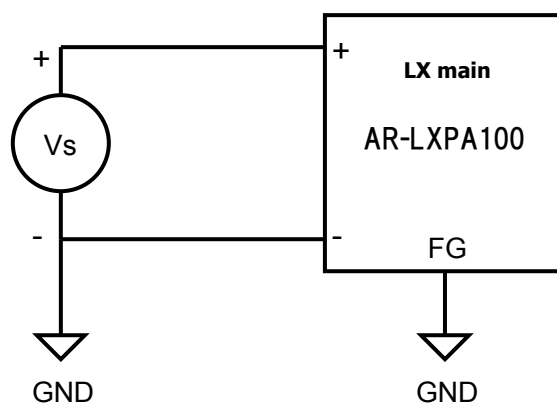
Whenever possible, connect the LX frame ground (FG) to ground.



When using the AC-powered sensor amp

Input Mode: Balanced (Bal) mode

Always connect the frame ground (FG) of the input signal source and the LX frame ground (FG) to ground.



■ Handling a reserved input terminal

Since the input impedance of the input amp is a high impedance of $1\text{M}\Omega$, there is a possibility that external disturbance noise will be mixed with the data. You can set the maximum of the input range or short-circuit the input to prevent interference by external noise.

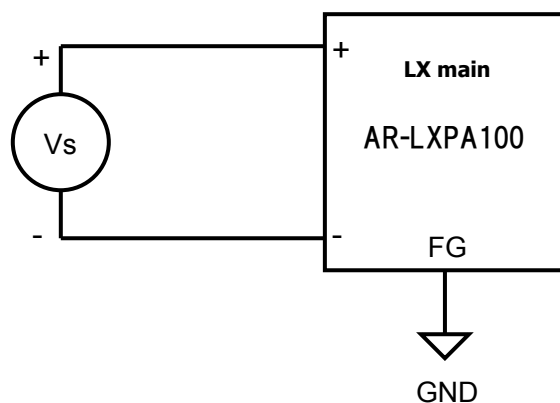
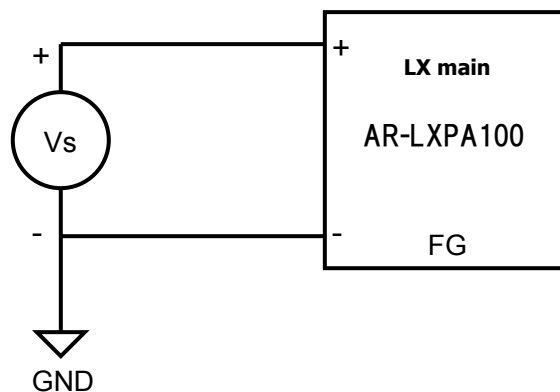
Input Amp Settings

When using a conventional AC powered signal output

Input Mode: Unbalanced (Unbal) mode

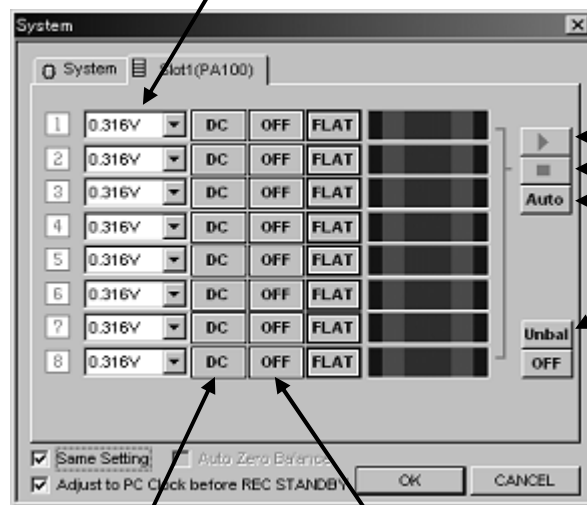
If the frame ground (FG) of the input signal source is connected to ground, do not connect the LX frame ground (FG) to ground.

If there is no frame ground (FG) of the input signal source, connect the LX-100 frame ground (FG) to ground.



AR-LXPA100 Setting Dialog

Select the input range(0.01 V, 0.0316 V, 0.1 V, 0.316 V, 1 V, 3.16 V, 10 V, 50V)



Confirm input level of every channel
Stop confirming input channel
Set input range automatically

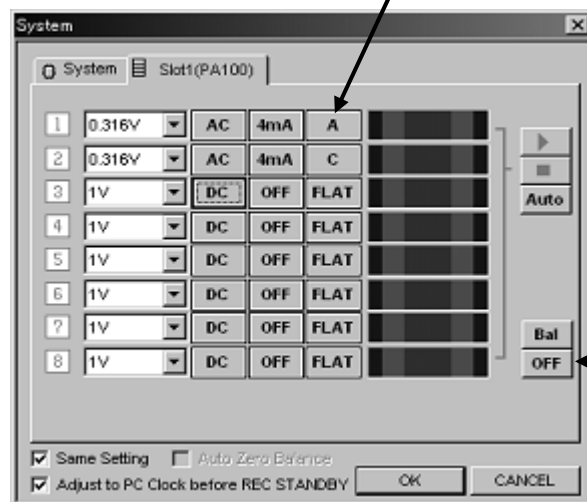
Select: Balanced or Unbalanced input
Bal: Balanced
Unbal: Unbalanced
Automatically set to DC coupling for all the 8 channels when the unbalanced input is selected

Select the coupling mode
AC: AC coupling
DC: DC coupling

Select turning ON or OFF of the power supply to the sensor connected.
OFF: No supply
4mA: Supply 4 mA constant current

AR-LXPA100 Setting Dialog

Select the weighting filter.
A: A filter
C: C filter
FLAT: Flat



Select HPF (High Pass Filter).
OFF: No
10Hz: 10 Hz
20Hz: 20 Hz

Bal/Unbal: Only a combination of **DC/OFF/FLAT** selections is applicable at **Unbal**.

■ At the AR-LXPA100 amp, the sensor power supply voltage is 28 V DC as a standard setting. Contact TEAC for a 24 V DC setting.

Input Amp Settings

ST Amp AR-LXST100


<ST100> is shown at the **Slot** tab.

The AR-LXST100 is an input amp applied for strain gauges, strain gauge type sensors and DC inputs. See Section 6 for the specifications.

Cautions on Using ST Amp

■ Calibration

It is suggested that you use the ST amp after turning on the power for 20 minutes or more, and then perform manual calibration. In order to perform manual calibration for precise measurement, click the

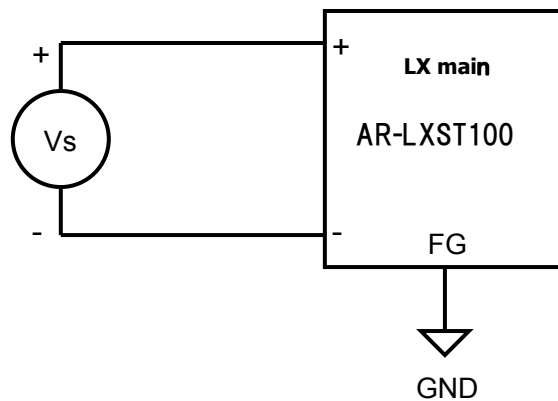
 button on the toolbar of the LX Navi.

■ Input Connection and Grounding

When using sensors:

Input Mode: Balanced (Bal) mode

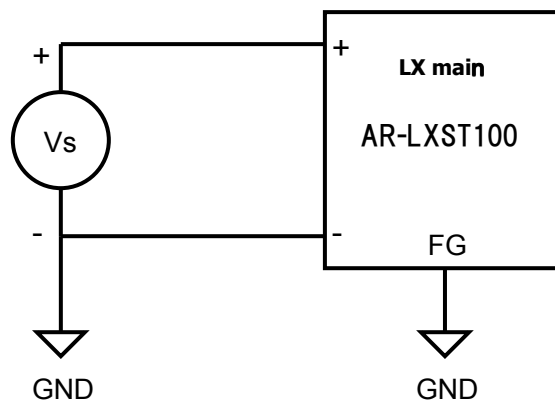
Whenever possible, connect the LX frame ground (FG) to ground.



When using the AC supply powered sensor amp

Input Mode: Balanced (Bal) mode

Always connect the frame ground (FG) of the input signal source and the LX frame ground (FG) to ground.

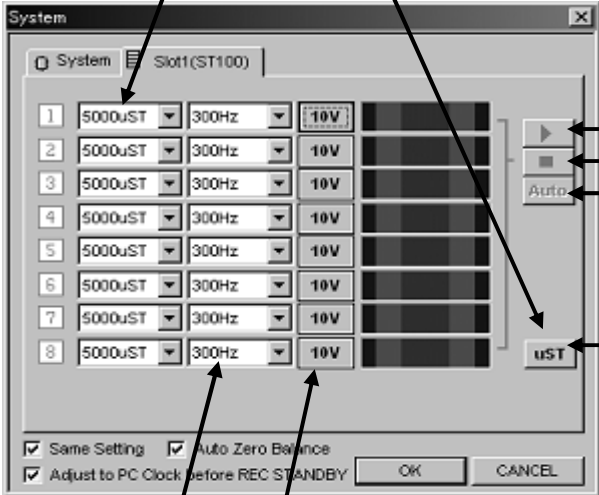


■ Handling a reserved input terminal

Since the input impedance of input amp is a high impedance of $1M\Omega$, it is possible that external disturbance noise will be mixed with the data. You can set the maximum of the input range or short-circuit the input to prevent the interference by external noise,

AR-LXST100 Setting Dialog

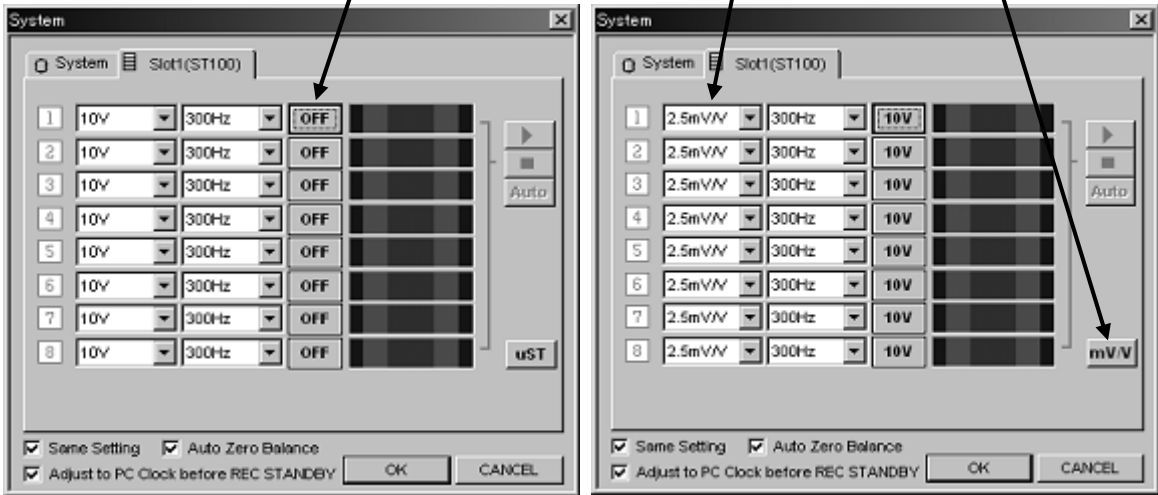
Select the input range
Click **uST** to turn the button at the right bottom to **mV/V**.



Confirm input level of every channel
Stop confirming input level
In case of ST100 amp, the function, which can set input range automatically, is not available.
Change the input range display between **uST** and **mV/V**.

Set the low pass filter.

Change the bridge voltage.
Turn to **OFF** to set the DC input range.



2.5mV/V 300Hz 10V
2.5mV/V 300Hz 10V
2.5mV/V 300Hz 10V
2.5mV/V 300Hz 10V
2.5mV/V 300Hz 10V
2.5mV/V 300Hz 10V
2.5mV/V 300Hz 10V
2.5mV/V 300Hz 10V

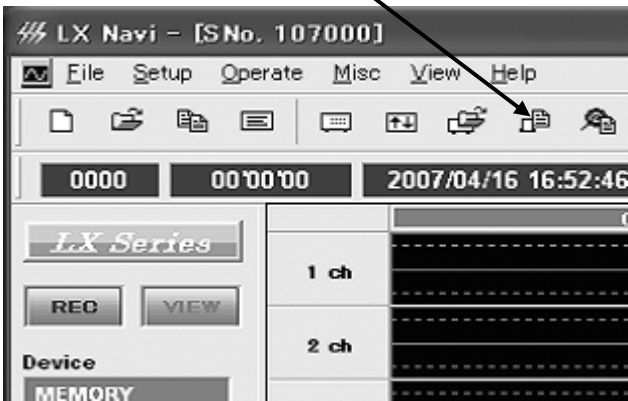
Same Setting Auto Zero Balance
Adjust to PC Clock before REC STANDBY OK CANCEL

Sensitivity Setting Using TEDS Functions

When a transducer/sensor conforms to the IEEE Std 1,451.4 A SMART TRANSDUCER INTERFACE is connected to the AR-LXPA100. The LX can read its Transducer Electronic Data Sheet (TEDS) information and then can display the information and set the acquired sensitivity coefficient automatically to the channel to which the transducer is connected.

■ If the information of the transducer does not comply with the IEEE TEDS standard template(ver0.9), the LX cannot read and display the information correctly.

1. Click the toolbar icon  in the main window.



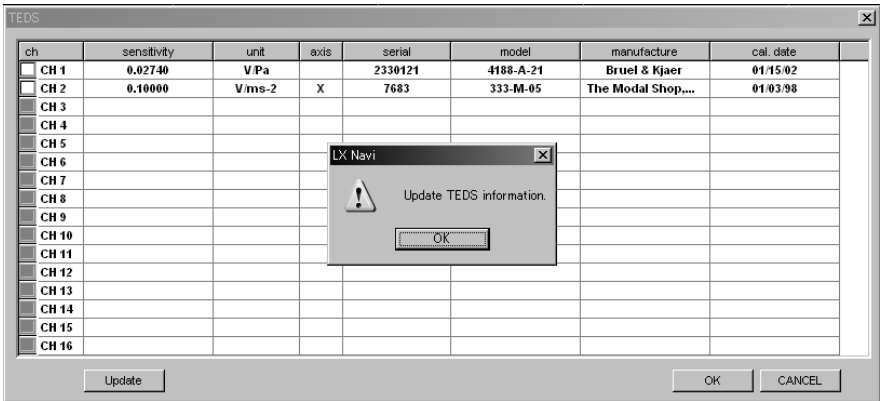
2. The **TEDS** dialog is displayed.

If you turn ON the power of the LX after connecting the TEDS transducers, the TEDS information is automatically loaded at the initial calibration stage, and the LX displays the following window shown below.



3. Click **Update** to read the TEDS transducer information.

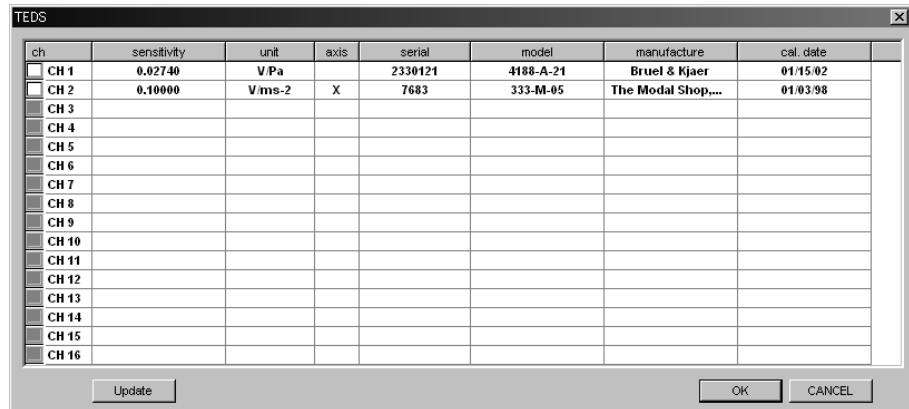
If you turn ON the power of the LX after connecting the TEDS transducers, the TEDS information is automatically loaded at the initial calibration stage, and the LX displays this window.



Sensitivity Setting Using TEDS Functions

4. Click OK when the <**Update TEDS information**> message is displayed.

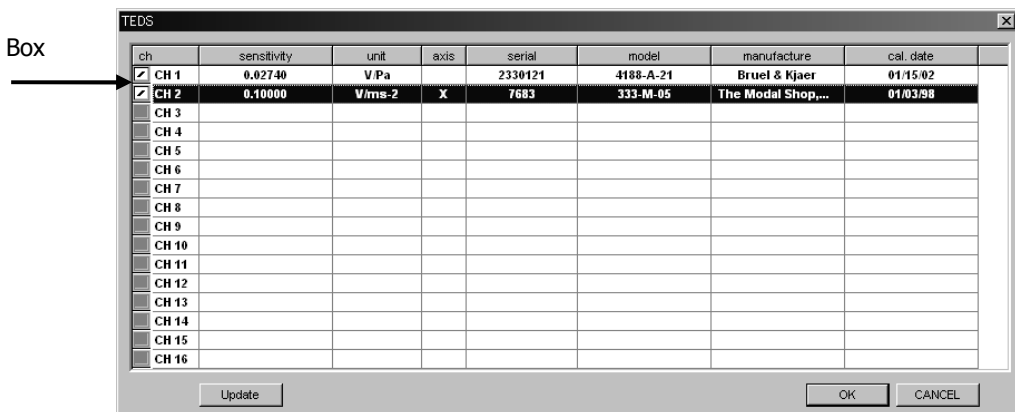
You can view the list of the TEDS transducer information connected to the amp, such as; Sensitivity (**sensitivity**), Unit (**unit**), Serial number (**serial**), Manufacturer name (**manufacturer**), and Calibration date (**cal date**).



ch	sensitivity	unit	axis	serial	model	manufacture	cal. date
<input type="checkbox"/> CH 1	0.02740	V/Pa		2330121	4188-A-21	Brueel & Kjaer	01/15/02
<input type="checkbox"/> CH 2	0.10000	V/ms-2	X	7683	333-M-05	The Modal Shop,...	01/03/98
<input type="checkbox"/> CH 3							
<input type="checkbox"/> CH 4							
<input type="checkbox"/> CH 5							
<input type="checkbox"/> CH 6							
<input type="checkbox"/> CH 7							
<input type="checkbox"/> CH 8							
<input type="checkbox"/> CH 9							
<input type="checkbox"/> CH 10							
<input type="checkbox"/> CH 11							
<input type="checkbox"/> CH 12							
<input type="checkbox"/> CH 13							
<input type="checkbox"/> CH 14							
<input type="checkbox"/> CH 15							
<input type="checkbox"/> CH 16							

Turn on the check box of the channel to reflect the sensitivity of the loaded TEDS information.

Check Box




ch	sensitivity	unit	axis	serial	model	manufacture	cal. date
<input checked="" type="checkbox"/> CH 1	0.02740	V/Pa		2330121	4188-A-21	Brueel & Kjaer	01/15/02
<input checked="" type="checkbox"/> CH 2	0.10000	V/ms-2	X	7683	333-M-05	The Modal Shop,...	01/03/98
<input type="checkbox"/> CH 3							
<input type="checkbox"/> CH 4							
<input type="checkbox"/> CH 5							
<input type="checkbox"/> CH 6							
<input type="checkbox"/> CH 7							
<input type="checkbox"/> CH 8							
<input type="checkbox"/> CH 9							
<input type="checkbox"/> CH 10							
<input type="checkbox"/> CH 11							
<input type="checkbox"/> CH 12							
<input type="checkbox"/> CH 13							
<input type="checkbox"/> CH 14							
<input type="checkbox"/> CH 15							
<input type="checkbox"/> CH 16							

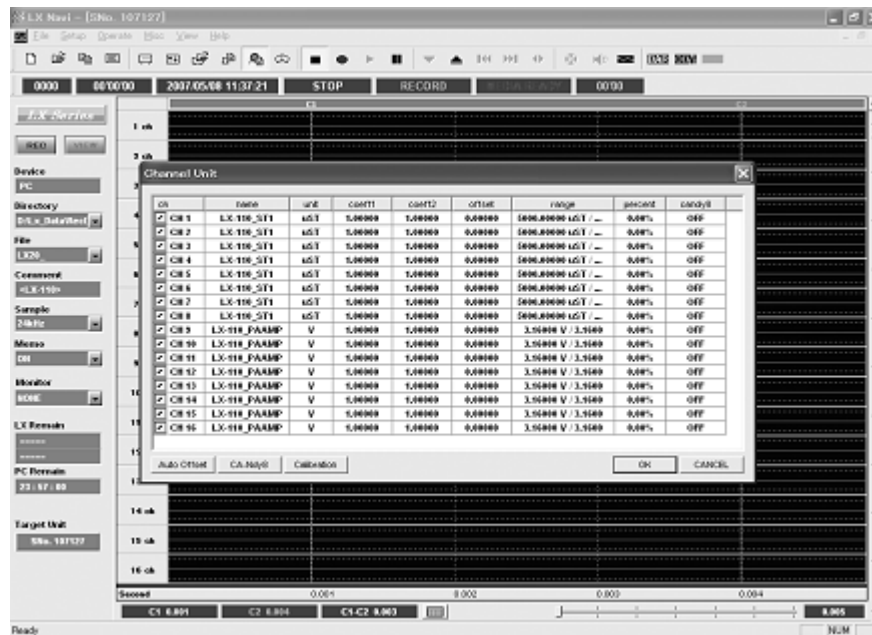
5. Click **OK** to write the applicable slope value (reciprocals of the loaded sensitivity) to the header file. Then, the window is closed. Open the channel property list at the main window to confirm that the slope value is updated based on the loaded TEDS information.

(See "Channel Property" on page 5-17.)

Auto Offset

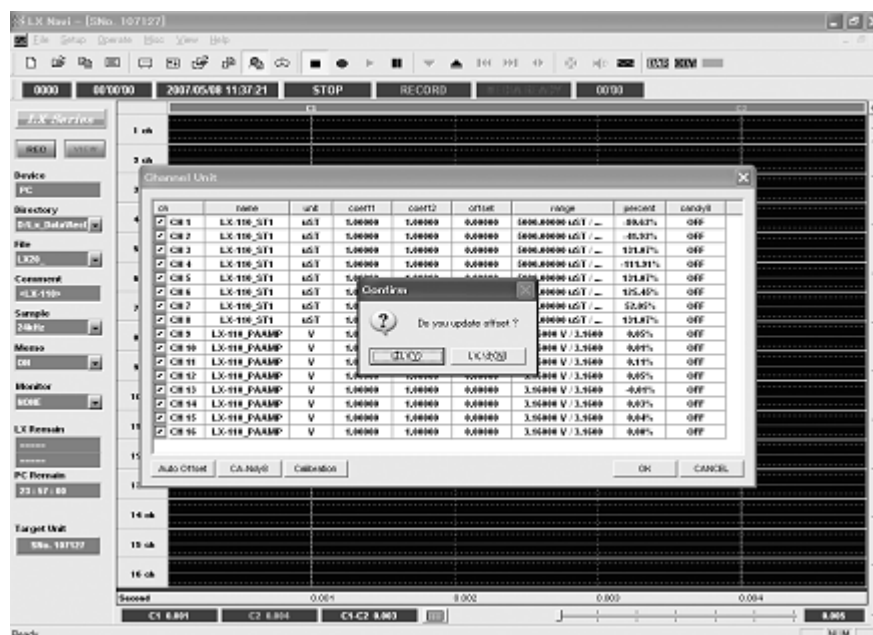
The auto offset function of the LX Navi measures the voltage of each channel when clicking the **Auto Offset** icon and then reflects its voltage value to the header file. The waveform data in the LX Navi displays Y-axis data by adjusting to zero by using this offset value.

1. Click  on the toolbar at the stop state of the LX main unit.
2. The **Channel Unit** table is displayed.




3. Click **Auto Offset** on the **Channel Unit** table at the timing to execute the offset. The LX measures the voltages of the channels at the click timing and displays these values in the **offset** field

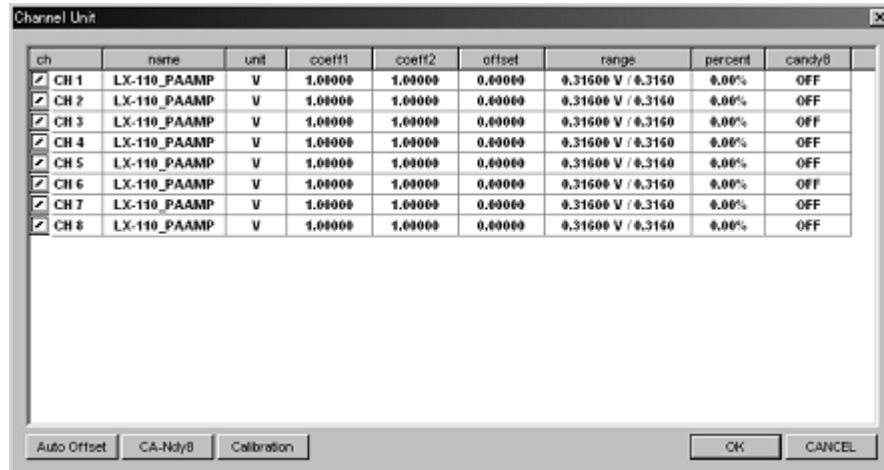
4. Click **OK** to apply the offset voltages displayed on the channels turning on their check boxes. The **Confirm** dialogue is displayed. Then click **Yes** to set the values.



Calibration By Using Calibrator

You can use a calibrator or a piston phone to apply a sensor sensitivity based on the actual measurement at the PA amp.

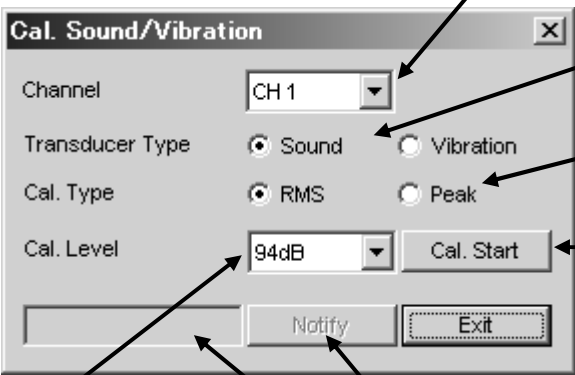
1. Click  on the toolbar at the stop state of the LX main unit.
2. The **Channel Unit** table is displayed.



ch	name	unit	coeff1	coeff2	offset	range	percent	candy8
<input checked="" type="checkbox"/> CH 1	LX-110_PAAMP	V	1.00000	1.00000	0.00000	0.31600 V / 0.3160	0.00%	OFF
<input checked="" type="checkbox"/> CH 2	LX-110_PAAMP	V	1.00000	1.00000	0.00000	0.31600 V / 0.3160	0.00%	OFF
<input checked="" type="checkbox"/> CH 3	LX-110_PAAMP	V	1.00000	1.00000	0.00000	0.31600 V / 0.3160	0.00%	OFF
<input checked="" type="checkbox"/> CH 4	LX-110_PAAMP	V	1.00000	1.00000	0.00000	0.31600 V / 0.3160	0.00%	OFF
<input checked="" type="checkbox"/> CH 5	LX-110_PAAMP	V	1.00000	1.00000	0.00000	0.31600 V / 0.3160	0.00%	OFF
<input checked="" type="checkbox"/> CH 6	LX-110_PAAMP	V	1.00000	1.00000	0.00000	0.31600 V / 0.3160	0.00%	OFF
<input checked="" type="checkbox"/> CH 7	LX-110_PAAMP	V	1.00000	1.00000	0.00000	0.31600 V / 0.3160	0.00%	OFF
<input checked="" type="checkbox"/> CH 8	LX-110_PAAMP	V	1.00000	1.00000	0.00000	0.31600 V / 0.3160	0.00%	OFF

Auto Offset CA-Noly8 Calibration OK CANCEL

3. Click **Calibration**.
4. The **Cal. Sound/Vibration** dialog is displayed.



Annotations for the **Cal. Sound/Vibration** dialog:


- Select the channel. (Points to the Channel dropdown menu showing CH 1)
- Select the type of the sensor to use. (Points to the Transducer Type radio buttons: Sound and Vibration)
- Select to use RMS or Peak value for calibration. (Points to the Cal. Type radio buttons: RMS and Peak)
- Start calibration. (Points to the Cal. Start button)
- Set the output level to match to the calibrator to be used. (Points to the Cal. Level dropdown menu showing 94dB)
- Being displayed the progress of the calibration. (Points to the Notify button)
- Apply the calibration result to the slope value. (Points to the Exit button)

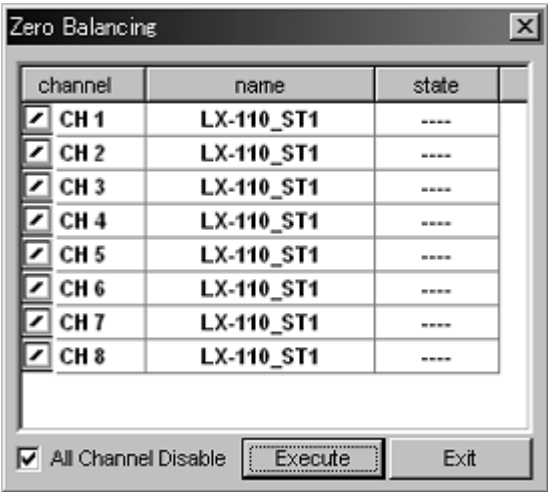
5. After the calibration has been performed, click **Exit** or click  to return to the main window.

Zero Balance

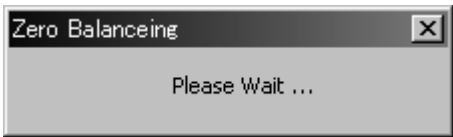
Zero Balance

Whenever turning on the power, use the zero balance function at the ST amp.

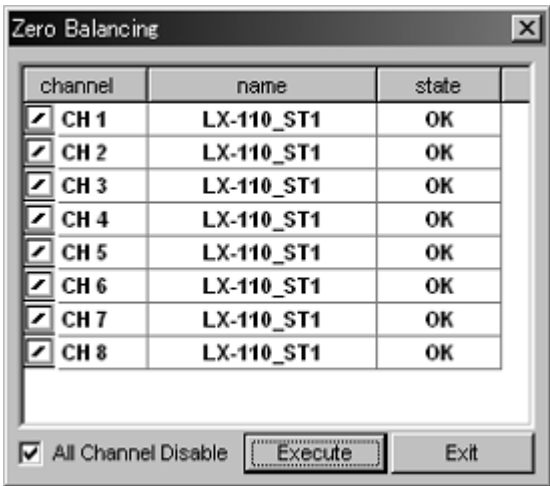
1. Click  on the toolbar at the stop state of the LX main unit.
2. In **Zero Balancing** dialogue, turn on the check box of the channel for zero balance and click the "Execute" button to start zero balance.



3. While in zero balance, the following dialogue is displayed and then disappears after showing the result.



4. The result of each channel's zero balance is displayed on items of the "State". The "OK" means normal and the "NG" means abnormal. Establish a setting of range value at the maximum of 100000uST/50mV/V on the channel with no input signal.



5. After the zero balance is completed, click **Exit** or click  to return to the main window.

Setting Tachometer Pulse Inputs

The LX-120 equips two of the tachometer pulse input channels in separate analog input channels. Their input connectors are located on the rear panel.

Either 16 bits or 32 bits mode can be selected. When you select the 16 bits mode for one channel, another channel is automatically effective at 16 bits mode. In 32 bits mode, you may select only one channel. However, if 24bits A/D is specified, 16 bits mode cannot be specified.

See Section 6 for the specifications.

■ 1 x 16 bits tachometer pulse input channel is equivalent to 1 x analog input channel. 1 x 32 bits tachometer pulse input channel is equivalent to 2 x analog input channels. Therefore, if you turn ON tachometer pulse input channel(s), in order to keep the same analog input channels, it is necessary to reduce the sampling frequency by following the setting of tachometer pulse input channel(s).

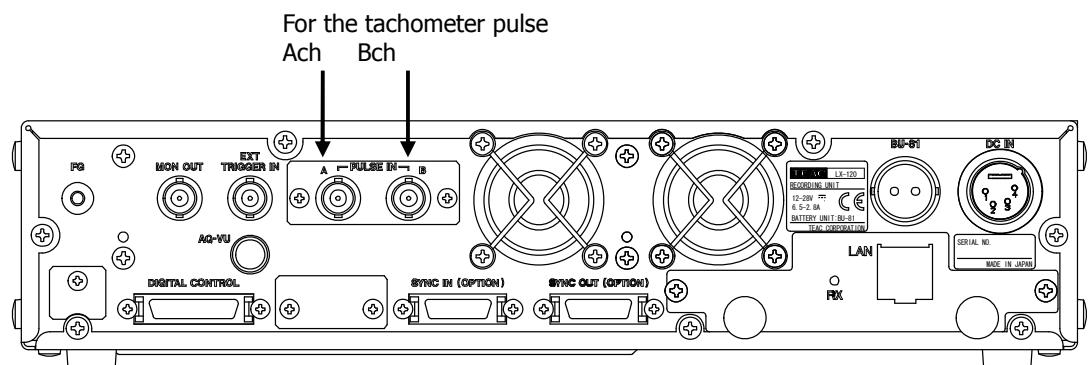
■ Set **Moving Average** to [1] only, when the sampling frequency of 102.4 kHz, 100 kHz, 96 kHz, 65.536 kHz, 51.2 kHz, 50 kHz, 48 kHz, or 32.768 kHz is selected.

■ Only 1 x 32 bits tachometer pulse input can be selected when the sampling frequency of 102.4 kHz, 100 kHz, 96 kHz, or 65.536 kHz is selected.

■ The LX Navi cannot monitor the tachometer pulse input in wave form display. Use the digital display to monitor. (Refer to page 5-17)

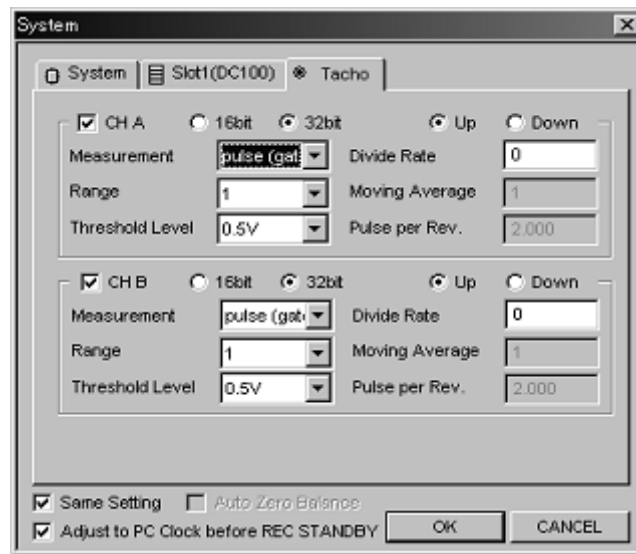
■ The LX cannot playback the recorded tachometer pulse input signals. Process the data as a digital data file.

■ You cannot use the tachometer pulse input channels and the generator output function at the same time.



Setting Tachometer Pulse Inputs

At the **System** dialog, click the **Tacho** tab to set the tachometer pulse input channel parameters.



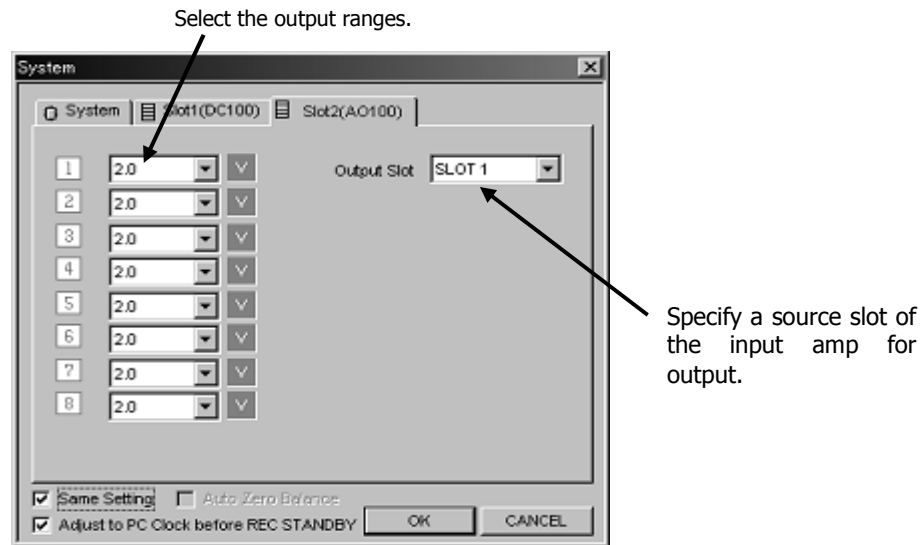
Turn on the check box to use the tachometer pulse input channel and select **16bit** or **32bit**. If you turn on both channels, the number of the bits to be selected must be the same. Other parameters are show below. However, in the case that 24bits A/D is specified, **16 bits** mode cannot be specified.

Parameters (Note: refer to the articles mentioned on the previous page.)

Setting Items	Contents
Measurement	Measurement mode
pulse (gate)	Pulse count mode within the gate time
pulse (total)	Total counts from start to stop of measurement
Period	Cycle count mode
Frequency	Frequency measurement mode
Rpm	RPM measurement mode
Range	Measurement range
At pulse (gate) mode	1 to 255 times the sampling frequency
At period mode	1m, 5m, 10m, 50m, 100m, 500m, 1 sec
At frequency mode	10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10k, 20 kHz
At rpm mode	1500, 3000, 6000, 9000, 12000, 15000, 18000, 24000 rpm
Threshold Level	Threshold level setting +0.5, +1, +2.5, +5, +10, +20 V (Select Rising/Falling of signal by UP · DOWN)
Divide Rate	Divide rate 1 to 255
Moving Average	Moving average setting 1 to 16
Pulse per Rev.	Pulse per revolution 1 to 255

Output Amp Settings

In the **System** dialog, click the tab of the slot in which the output amp is installed to set the output ranges.



Output Range Setting

You can select an output range of 1 V to 5 V in 0.1 V steps.

- If recording or reproducing on low-speed sampling series, buy the optional unit to analog-output form output amp.
- Make sure to specify the source slot installed the input amp at the **Output Slot**.
- In LX series, $\pm 100\%$ of input range is equivalent to ± 25000 of 16 bits A/D or ± 6400000 of 24 bits A/D, so that the output amp outputs the signal at a scale of $\pm 100\%$ of the specified output range. For example, if you record + 1V signal at the 1 V input range and you set the output range at 2 V, you will obtain a +2 V signal corresponding to the recorded 1 V signal.

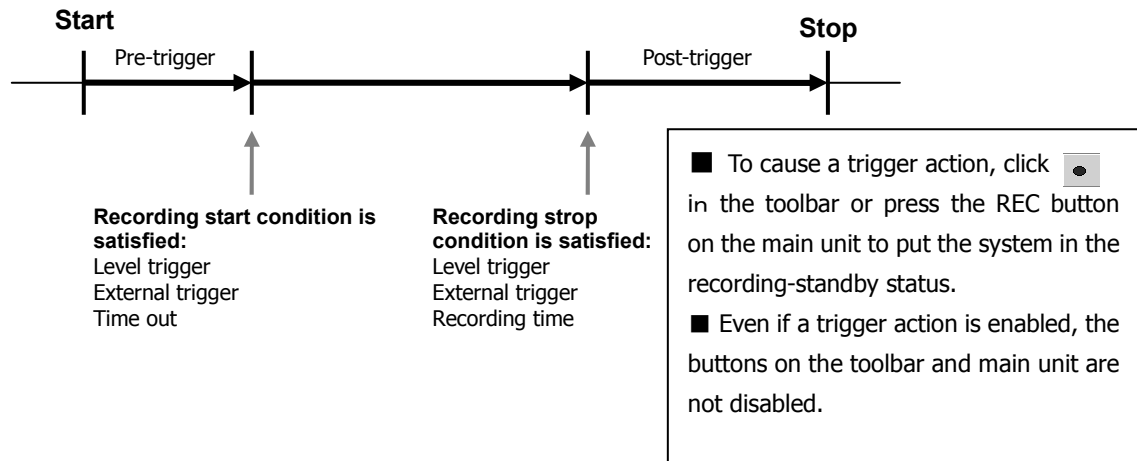
Outline of Trigger Recording

Outline of Trigger Recording

In addition to manual operation, you can also start or stop recording automatically in the following modes.

Repeat Mode

Repeats the recording operation for a specified number of times, as shown in the following diagram. You can also specify "1" to record one time only.



<Recording-Start Conditions>

Level trigger

The trigger is a change in level in a specified channel.

External trigger

The trigger is a contact signal to the EXT TRIGGER IN the connector on the rear of the LX. (L level: starts if 0.6 V or less) If the level is already L when the system enters the recording-standby status, recording starts at once in memory/MO recording. In PC recording, however, recording starts when the signal changes from H to L after the system enters the recording-standby status.

Time-out

Recording is forced to start if the specified recording- start condition is not satisfied during a set period.

Pre-trigger

A pre-trigger also records the data that was read into a buffer before one of the above recording-start conditions was satisfied. The voice memo is not recorded during that period.

<Recording-Stop Conditions>

Level trigger

The trigger is a change in level in a specified channel.

■ External trigger

The trigger is a contact signal to the EXT TRIGGER IN the connector on the rear of the LX. (H level: stops if open or 2 V or more)

■ Recording time

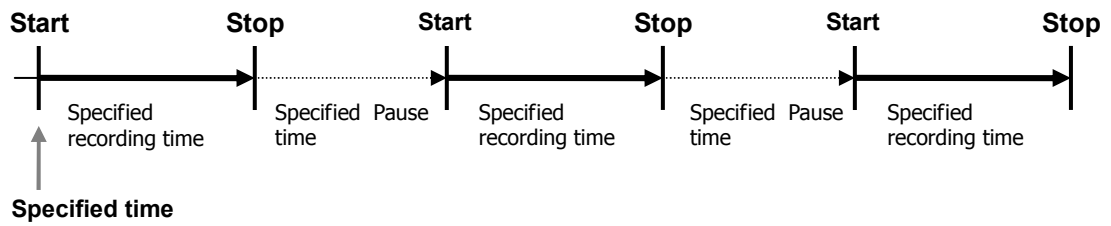
Records for a specified period only.

■ Post-trigger

Continues to record for a set period even after a recording-stop condition is satisfied. If the recording is stopped by manual operation, the post-trigger is not recorded.

Interval Mode

Repeats the starting and stopping of recording for a specified number of times, during a specified period.
You can also specify "1" to record time only.

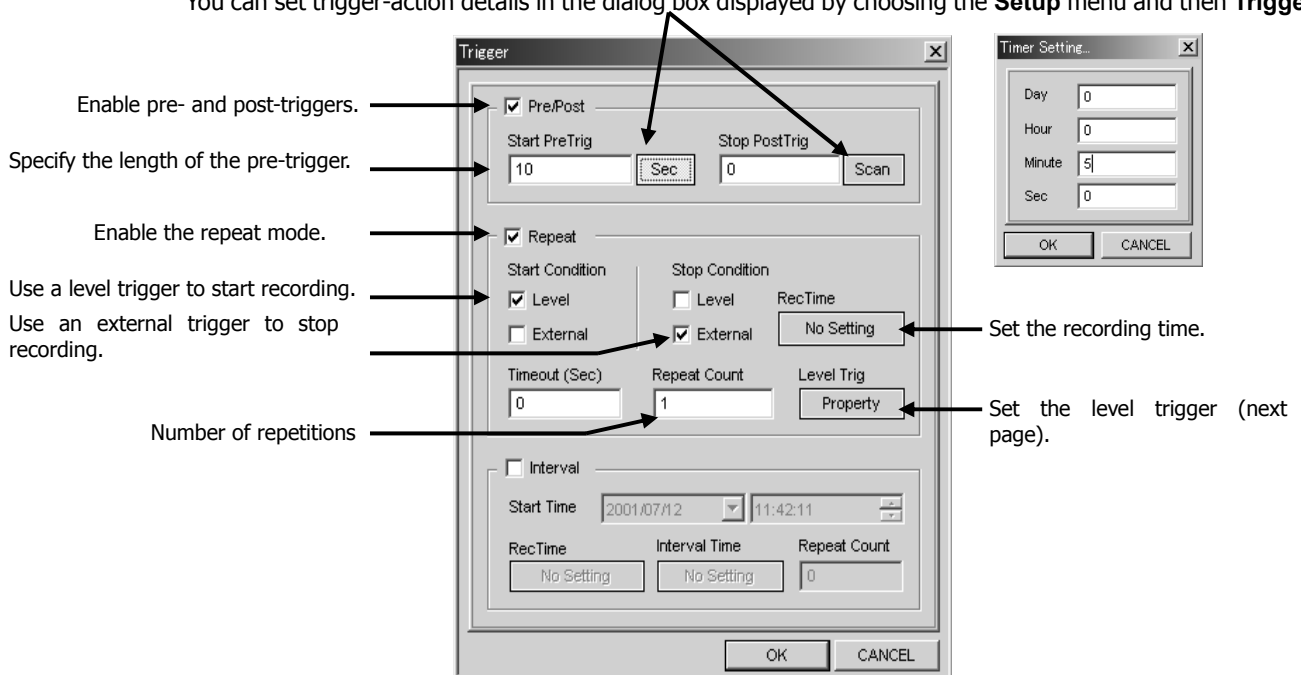


(Example: When repeating 3 times)

Repeat Mode Settings

Repeat Mode Settings

You can set trigger-action details in the dialog box displayed by choosing the **Setup** menu and then **Trigger**.



The settings in the above dialog box use a level trigger to start recording and an external trigger to stop recording. A 10-second pre-trigger is specified, and recording is done once.

Pre/Post

Select this to enable a pre-trigger or post-trigger. Turn on the check box to enable pre/post trigger. (The post-trigger is not enabled for stopping recording by operations that use the toolbar or the buttons on the LX main unit.)

Start PreTrig

Specify the length of the pre-trigger in seconds or in scan units. To switch the units, click a button on the right. When 0 is entered, **Timeout** is disabled. Set a value that does not exceed the upper limit of the pre-trigger setting.

The upper limit of pre-trigger setting can be calculated as follows.

Upper limit value (scan)

$$= (63\text{MByte} \times 0.6) / [((\text{Number of analog input ch.} + \text{Number of tachometer Input ch.}) \times \text{AD width})]$$

Upper limit value (sec)

$$= \text{Upper limit value (scan)} / \text{Sampling frequency (Hz)}$$

※ 63MByte x 0.6: Memory capacity used for pre-trigger is 60% of 63Mbyte.

The memory capacity used for pre-trigger can not be increased by adding optional expansion memory.)

※ AD width 2 for 16 bits A/D, 4 for 24 bits A/D

Number of tachometer input channels: use "2" in 16 bits mode, "2" for 32 bits/1 channel mode, or "4" for 32 bits/2 channels mode. In 24 bits A/D: not available in 16 bits mode, "1" for 32 bits/1 channel mode, or "2" for 32 bits/2 channels mode. Tachometer input channels are available for LX-120 only.

※ The upper limit(sec) decided by the 96k Hz series sampling frequency and the number of channels is calculated based on

1Mbyte = 1048576Byte.

96kHz series	Pre-trigger upper limit (sec) by channel number					
	2	4	8	16	24	32
Sampling rate(kHz)						
96	103 / 51	51 / 25	25 / N.A.	N.A.	N.A.	N.A.
48	206 / 103	103 / 51	51 / 25	25 / N.A.	N.A.	N.A.
24	412 / 206	206 / 103	103 / 51	51 / 25	34 / N.A.	25 / N.A.
12	825 / 412	412 / 206	206 / 103	103 / 51	68 / 34	51 / 25
6	1651 / 825	825 / 412	412 / 206	206 / 103	137 / 68	103 / 51
3	3303 / 1651	1651 / 825	825 / 412	412 / 206	275 / 137	206 / 103
1.5	6606 / 3303	3303 / 1651	1651 / 825	825 / 412	550 / 275	412 / 206

N.A.:Not available

CAUTIONS: (Number of analog input ch. + Number of tachometer input ch.) x Sampling Frequency(Hz) x AD width \geq 524288

Continuous recording operations might not be done (stopped when memory becomes full while recoding) when the pre-trigger settings are made as in the above conditions.

Stop Post Trig

Specify the length of the pre-trigger in seconds or in scan units. To switch the units, click a button on the right. When 0 is entered, **Timeout** is disabled. Set a value so that it does not exceed the upper limit of the post-trigger setting.

The upper limit of the post-trigger setting can be calculated as follows. If the media becomes full during recording, it stops regardless of the setting of post-trigger.

Upper limit value (scan)
= 999999999

Upper limit value (sec)
= 999999999 / Sampling frequency (Hz)

Repeat Mode Settings

Repeat

Select this to enable the Repeat mode.

Start Condition

Specify a recording-start condition. If multiple conditions are set, the first condition satisfied will start the recording.

Level: Select this to enable a level trigger. You can set level trigger details in the dialog box displayed by choosing **Level Trig** and then **Property**. (See the next page.)

External: Select this to enable an external trigger.

Timeout: If a level trigger or external trigger has been enabled, you can cause recording to start if a specified recording-start condition is not satisfied during a specified period. Specify the period in seconds. When 0 is entered, **Timeout** is disabled. The maximum value is 4294967295 sec.

Stop Condition

Specify a recording-stop condition. If multiple conditions are set, the first condition satisfied will stop the recording.

Level: Select this to enable a level trigger. You can set level trigger details in the dialog box displayed by choosing **Level Trig** and then **Property**. (See the next page.)

External: Select this to enable an external trigger.

Retime: Enables you to stop recording after a set period has elapsed from the start of recording. You can set the period in the dialog box displayed by clicking the button. The value you set is displayed in this area.

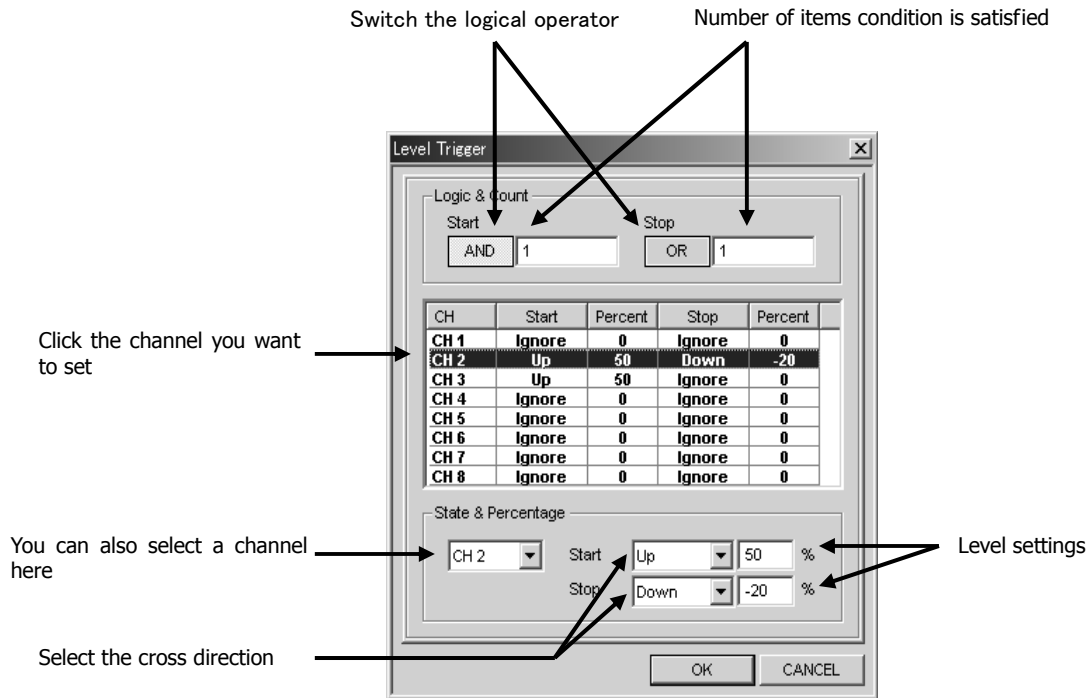
■ Make sure to turn the trigger signal level to High before the next start, when you are using an external trigger for starting with a repeat recording by use of REC TIME.

Repeat Count

Specify the number of times the trigger recording operation specified above is to be repeated. A file is made for each of the specified number of times. You can also specify "1" to record one time only. Specifying 0 will result in an unlimited number of repetitions (repetitions until you manually stop recording). The maximum value is 65535 counts. In case of multi counts or infinite counts, the period between the recording stop and start is 5 sec or more when you do recording synchronization (Refer to "Recording Synchronization" on page 29 in Section 5 "Operations") and 3 sec when you don't. (For media recording, many more seconds may be required)

Level Trigger Settings

To specify the details of the level trigger, click **Level Trig – Property** in **Trigger** dialogue.



The settings in the above dialog box are such that recording starts when the input signal of channel 2 crosses from a value lower than +50% of the specified input range to one that is higher than +50%, AND, the channel 3 signal crosses from a value that is lower than +50% to a higher one. Recording stops when the input signal of channel 2 crosses over from higher than -20% of the specified input range to lower than -20%.

Channel selection

In the list of channels, click the desired channel. Alternatively, select the channel from the drop-down list box in the lower left of the window.

Select the cross direction:

Up: The condition is regarded as having been satisfied when the input signal crosses from less than the specified level to a level that is higher. The condition is regarded as not having been satisfied if the specified level was already higher when the recording-standby status was entered.

Down: The condition is regarded as having been satisfied when the input signal crosses from a higher than specified level to one that is lower. The condition is regarded as not having been satisfied if the specified level was already lower when the recording-standby status was entered.

Ignore: The channel is not monitored for the level trigger.

Level settings

The full scale of the specified input range is set at 100% on both the plus and minus sides. You set the monitoring level for these in the range from -99% to +99%. Enter a minus sign (-) for minus values. In the above dialog box, when the input range is 10 V, 50% becomes 5 V and -20% becomes -2 V.

Logic

When multiple channels are monitored for **Start** and **Stop**, specify whether these are combined using a logical **AND** or logical **OR**.

■ If you specify AND, the channels to be monitored should be in the same slot.

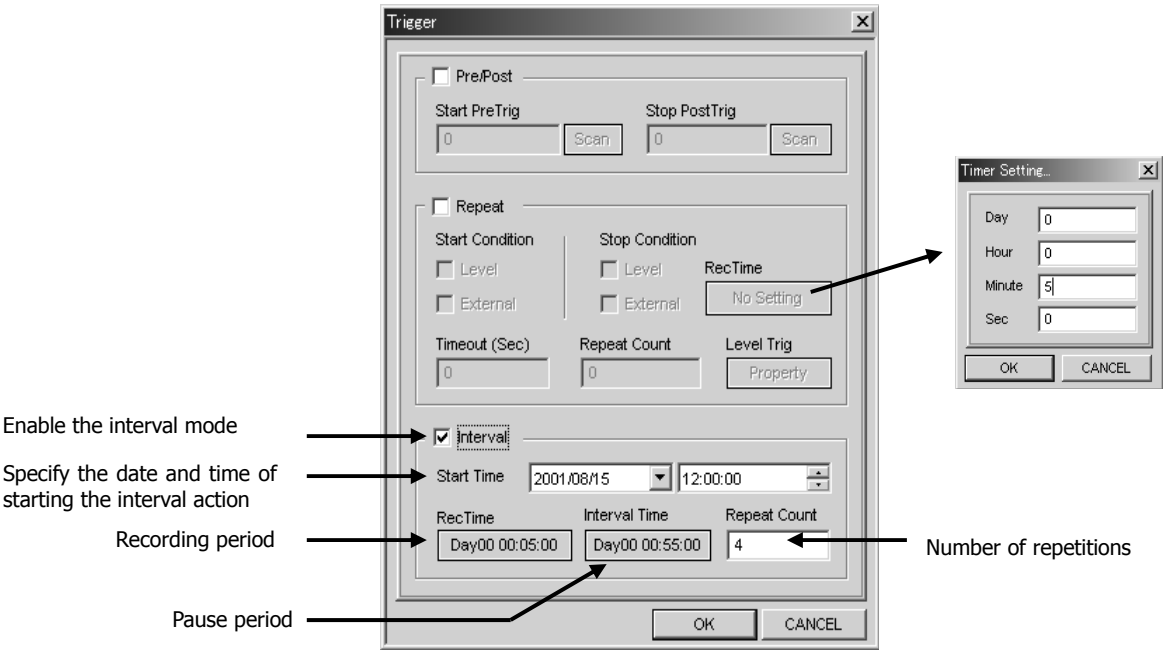
Interval Mode Settings

Number of times condition is satisfied

Specifies how many times a condition is regarded as having been established when a condition specified above (including the logical operator) is satisfied multiple times. The maximum value is 32767 counts.

Interval Mode Settings

You can set trigger-action details in the dialog box displayed by choosing the **Setup** menu and then **Trigger**.



The settings in the above dialog box specify that there are to be 4 recordings, each of which shall begin every hour on the hour from noon on August 15, 2001 and end in 5 minutes.

Interval

Select this to enable the Interval mode.

Start Time

Specify the date and time when the interval action is to start.

Rec Time

Clicking this displays a dialog box in which you can specify the recording period. The value you set is displayed in this area.

Interval Time

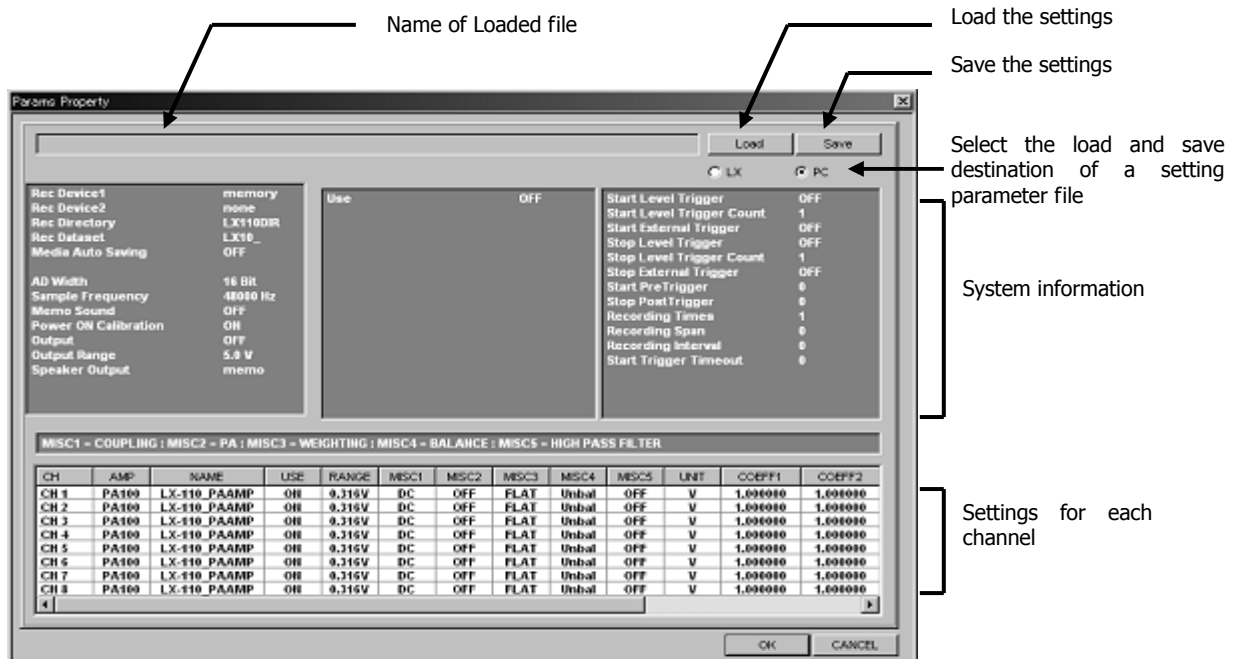
Specify the interval to wait before recording. (Note that this is not the cycle period.) Clicking this displays a dialog box in which you can specify the interval. Set the interval time to 5 sec or more when you do synchronization recording (Refer to "Recording Synchronization" on page 29 in Section 5 "Operations") or 3 sec when you don't. (For media recording, many more seconds may be required) The value you set is displayed in this area.

Repeat Count

Specify the number of times the recording is to be repeated. A file is made for each of the specified number of times. You can also specify "1" to record one time only. Specifying 0 will result in an unlimited number of repetitions (repetitions until you manually stop recording). The maximum value is 65535 counts.

Saving and Loading Settings

The parameters that you set after choosing the **Setup** menu and then **System** and **Trigger** can be saved to a file and then loaded whenever required. When you choose **Params Property** from the **Setup** menu, the following dialog box is displayed.



Saving Settings

Save the parameter settings as a file. The file extension is ".prm". We recommend that you save your settings to avoid potential problems.

1. Click **Save** at the **Params Property** dialog.
2. When you select the **LX** (the media loaded into the LX main unit) for the destination to save, the **LX Parameter File List** dialog will be displayed. Enter the file name to save the setting parameters at the bottom of the dialog, or select the file name for which the parameters will be changed, and then click **OK**.



3. When you select the **PC** for the destination to which to save, the **Save As** dialog will be displayed. Enter the folder to save and the file name, and then click [Save(S)].

Saving and Loading Settings

- The setting parameter file is saved as ASCII format, so that you can open the file by using the word pad program of Windows. Never replace the contents or you will not be able to load the file at the LX.

Loading Settings

Load the prm file previously saved.

1. Click **Load** at the **Params Property** dialog.
2. When you select the **LX** (the media loaded into the LX main unit) for the destination to load, the **LX Parameter File List** dialog will be displayed. Select the file name to load its parameters, and then click **OK**.



The loaded file name is displayed at the **Params Property** dialog.

3. When you select the **PC** for the destination to load, the Open dialog will be displayed. Enter the folder to load and the file name, and then click [Open (O)].

The loaded file name is displayed at **Params Property** dialog.

4. Click OK at the **Params Property** dialog.
The LX will be set at the contents of the loaded file.

Section 5 Operations

Specifying Recording Devices and File Names

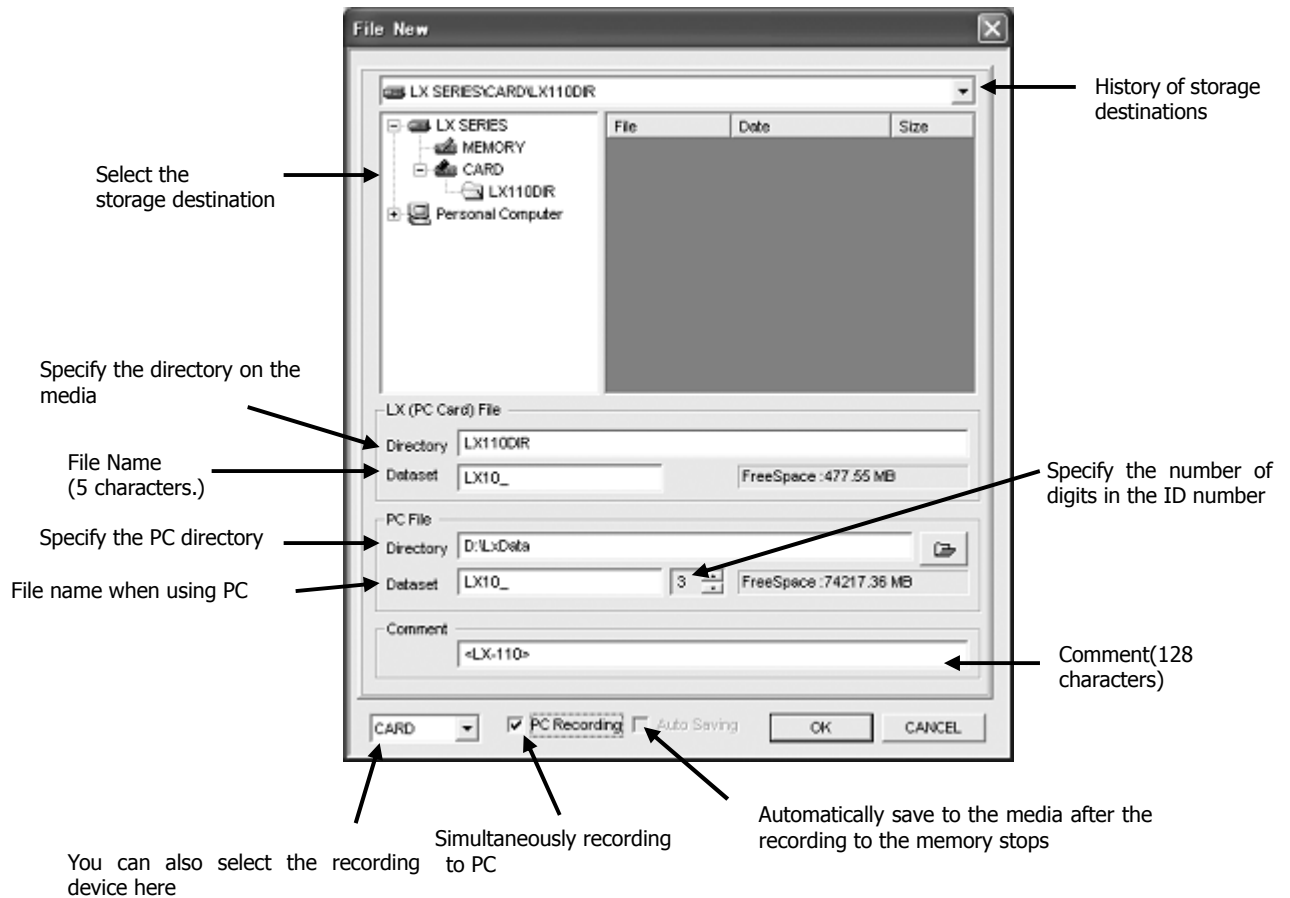
Specifying Recording Devices and File Names

The general procedure for recording is as follows:

1. Choose **File** → **New**, and specify the recording device and the file name. (The mode becomes the recording mode.)
2. Use the toolbar or the buttons on the main unit to record.
3. If you are recording to the memory, use the **Copy** dialog to copy to the media (PC card).

■ A combination of the sampling frequency vs. the number of analog input channels varies depending on the selected recording mode, such as the type of the recording media and the number of tachometer input channels. See “Sampling Frequency and Number of Channels” on page 1-13.

File → **New**



■ About File Names

When Recording to Memory or to Media

A maximum of 5 alphanumeric characters are available for use in designations. (Prohibited characters . , ; : < > [* ? = " / ¥ |) The system attaches a 3-digit ID number (starting from 001) to these 5 characters to make a total of 8 characters. If the designated character is 4 or less, the portion between the characters and the 3 digits will be filled with "0", and the number of characters in the file name will become 8 in total.

When Recording to a PC

When recording to a PC, or when recording to a PC while recording to memory or media, there is no restriction on the length of the file name. (Prohibited characters . , ; : < > [* ? = " / ¥ |) In the entry box on the right of the file name, you can choose how many digits to use for the ID numbers appended to the file name. Use up to 8 digits for the ID number. For example, if you enter 2 in the entry box, the number of recordable files is up to 99.

Data files have the extension ".dat". Header files have the extension ".hdr".

Do not add numeric characters to the end of a file name. If you do, the following problem may occur.

Example: Suppose you specify the file name as "LX10", the 8-character file names are constructed as follows:

```
LX100001
  ↓Increment
LX100002
  ↓Increment
LX100003
```

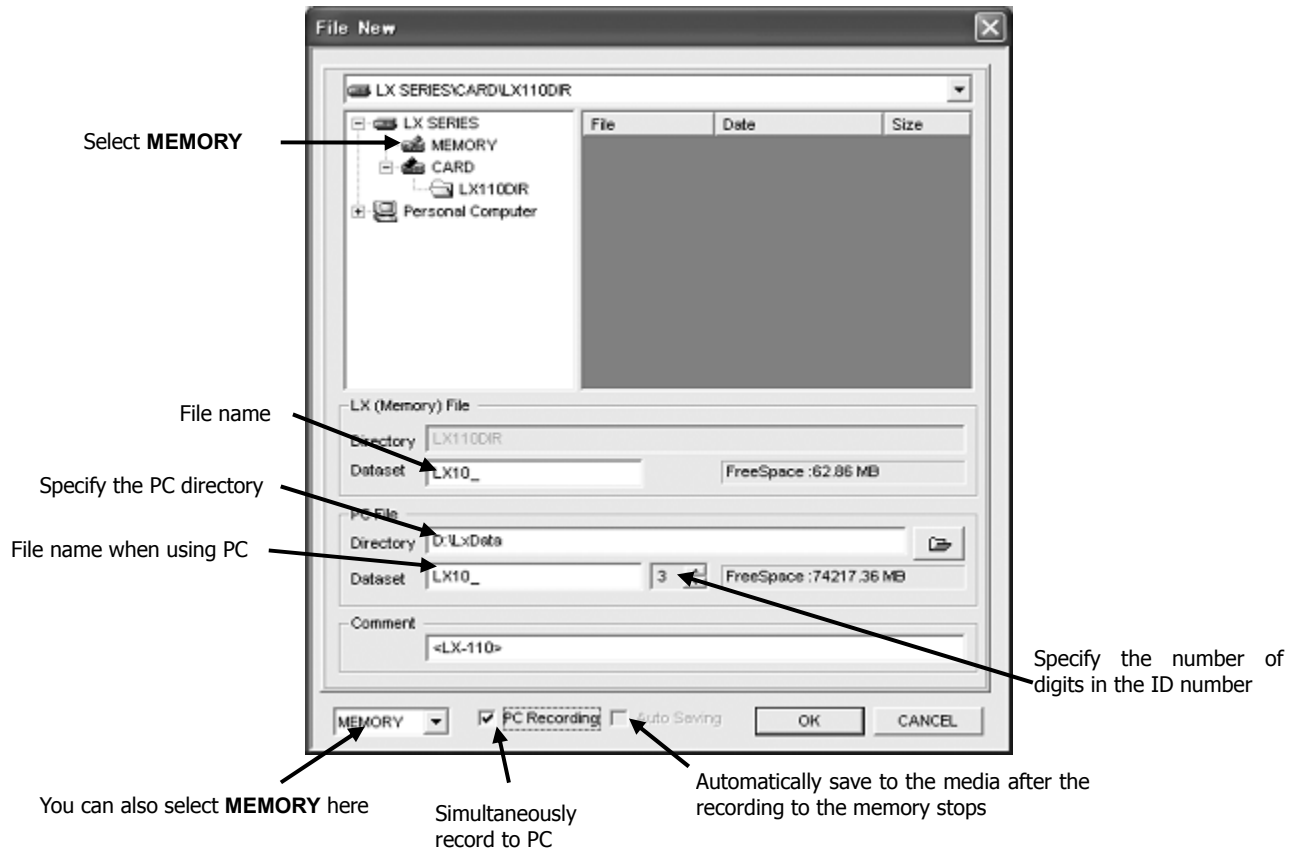
If you then specify a new file as "LX1" and record it to the same folder, the system will find that there is an existing file called LX100001 and so, to prevent overwriting this file, the system will use LX100004 as the new file name.

■ About Comments

You can enter a comment using up to 128 alphanumeric characters. This comment is written into the header file.

Specifying Recording Devices and File Names

Recording to Memory



When you are recording to memory, the message **Do you copy data?** is displayed after recording stops. If you click **Yes**, the **Copy** dialog box is displayed. If you again record data or power off the main unit before copying, the data in memory will be lost. If you again record data or power off the main unit before copying, the data in memory will be lost.

If you click **No** in response to the message **Do you copy data?**, you can choose **File** and then **Copy** to copy the data before again recording or powering off the main unit.

1. From the **File** menu, select **New**.
2. Select **<MEMORY>** as the storage destination.
3. Type a file name within 5 characters at **Dataset**.
4. Click **OK**.

■ If memory becomes full

If memory becomes full during recording, the recording stops and a message is displayed on the PC screen.

■ Recording to a PC While Recording to Memory

To record to a PC while recording to memory, select **PC Recording**, enter the storage-destination directory in PC, and then type the file name in the entry box below that. Also specify the number of digits in the ID number.

Dropouts may occur in the data recorded on the PC if the PC cannot keep up with the transfer speed. However, in this case, the data recorded in memory is not lost.

The voice memo is not recorded on the PC, although it is kept in memory.

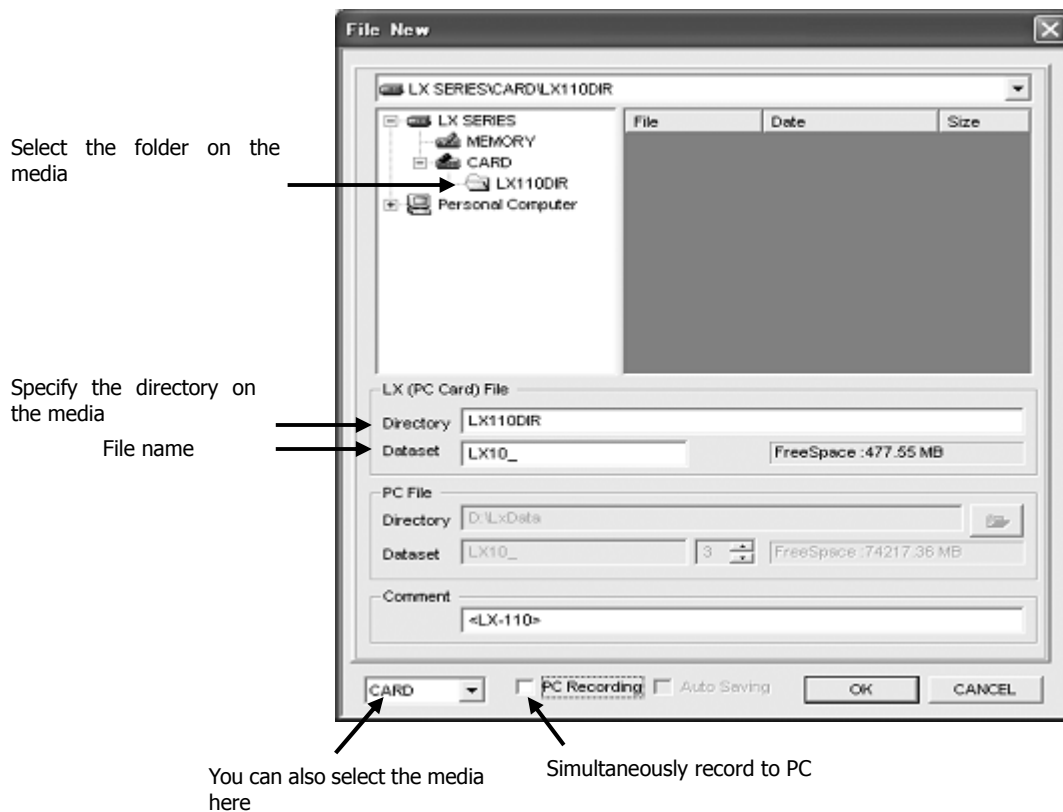
■ Automatically Save Data to Media

You can specify that data is to be automatically saved to the media after the recording to memory stops. Before opening this **New** dialog box, insert the media. Select **Auto Saving** and enter the folder name in **Directory**. Use up to 8 characters for the folder name, with the upper case used for alphabetic characters. However, if you forget to insert the media before the recording starts, you will be unable to copy automatically even if you insert the media later. In such a case, use **File** and then **Copy** to copy.

Even if **Auto Saving** is selected, when the LX is powered off the setting is disabled. So select **Auto Saving** whenever you turn the power on. Do not use this function when using the LX as a stand-alone device because, in such a situation, the system does not know how much free space is left on the media. In case the free space of the media is not enough, the file created will be decreased in size for saving on the media.

Specifying Recording Devices and File Names

Recording to Media (PC Card)



When recording with a maximum sampling frequency that can be set below the selected channel configuration, use a formatted media that has not been used for recording. If you use a media that has already been recorded on, the recording may stop.

1. Make sure that a formatted media is inserted in the main unit.
2. From the **File** menu, select **New**.
3. Select a folder on the media as the storage destination. When using a media for the first time, enter a folder name in **Directory**. For the folder name, use up to 8 characters (alphabetic characters are upper-case).
4. Enter a file name within 5 characters at **Dataset**.
5. Click **OK**.

■ Recording to the media cannot start if no media has been inserted. (The REC button has no effect.)

Specifying Recording Devices and File Names

■ Recording to a PC While Recording to Memory

To record to a PC while recording to memory, select **PC Recording**, enter the storage-destination directory in PC, and then type the file name in the entry box below. Also, specify the number of digits in the ID number.

Dropouts may occur in the data recorded on the PC if the PC cannot keep up with the transfer speed. However, in this case, the data recorded in memory is not lost.

The voice memo is not recorded on the PC, although it is kept in memory.

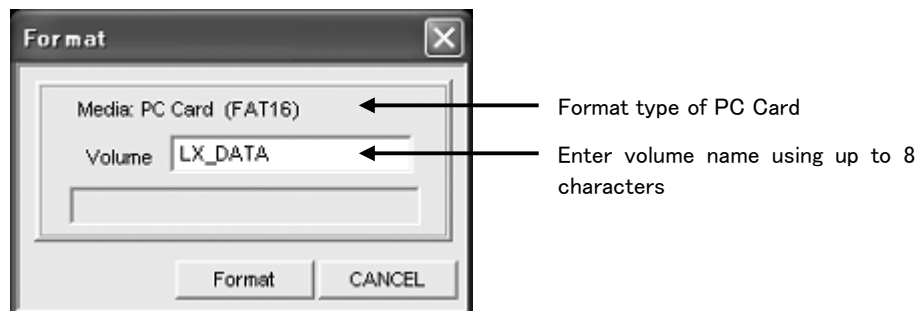
■ When the Media Becomes Full

If the memory becomes full during recording, the recording stops and a message is displayed on the PC screen.

■ Formatting Media

If the PC Card becomes full and the data is not needed, reformat the MO disk. (When using the PC Card for the first time, perform a full format by the PC once.)

1. From the **File** menu of LX Navi, choose **Format**.

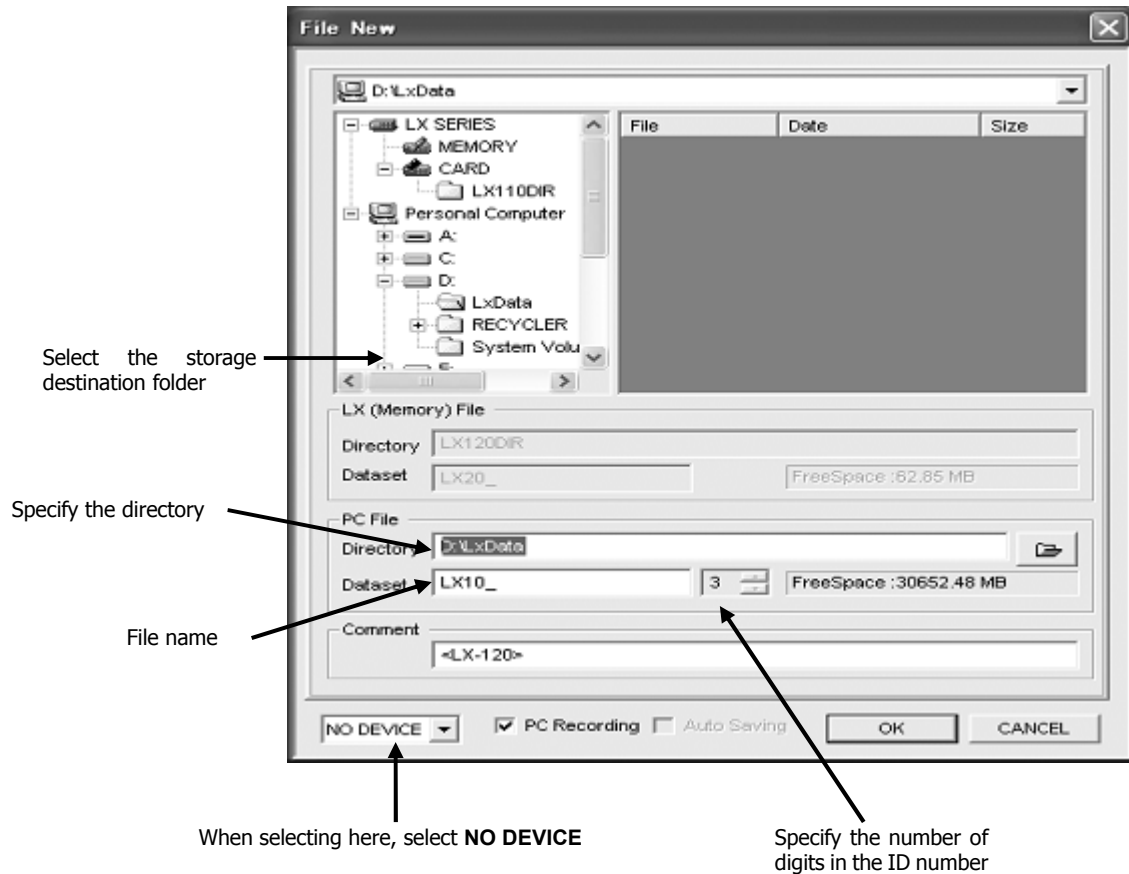


2. In **Volume**, enter the volume name. Use up to 8 characters
3. Click **Format**.
4. When the displayed status changes from Now Formatting to Complete, the formatting has finished.

Use the FAT16 option whenever formatting the PC card under a Windows operation.

Specifying Recording Devices and File Names

Recording to PC



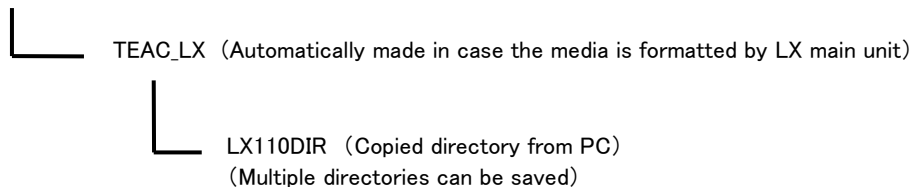
1. From the **File** menu, select **New**.
2. Select a PC folder as the storage destination.
3. Type the file name.
4. Specify the number of digits in the ID number.
5. Click **OK**.

Notes for reproducing a PC-recorded file by the LX main unit

For recording data on PC, copying it onto a PC Card, and then reproducing it correctly by the LX main unit, take the following steps.

- 1 If the PC recorded file has a long file name, change it to short file name (file name: 8 characters + file extension: 3 characters) to save on the PC's HDD. A pair of recording file (data file, header file, and, voice memo file) should be changed to have the same name and the extension name should be remained. Half-width alphanumeric characters and some symbols can be used for file names. (Prohibited symbols . , ; : < > [] * ? = " / \ |)
2. Create the directory with a name (example: "LX10_DIR") of 8 characters or less, and copy the LX recording data of a short file name to it.
3. After formatting the PC card media, insert it into the PC Card slot connected to the PC
4. The root directory of the PC card has another directory named "TEAC_LX" in its next level. Copy the whole directory made in step 2 to this directory of "TEAC_LX".

Root (The root directory of media)



If the total size of files (including data file, header file, and voice memo file) to be copied is larger than the one of the CF Card, reproducing cannot be done by the LX main unit, since all of the data cannot be copied onto the media.

The data recorded by LX-120 enabling tachometer channels cannot be reproduced as the correct waveform because of the data that was reproduced incorrectly. (Recoding on the media of the LX main unit directly will result in the same as above)

When using the PC Card for the first time, do a normal format of FAT16 or FAT32 first before using it. It may not be used normally on LX without these operations.

The total number of folders and data files, which can be created on a PC Card and operated correctly, is 10,000. You can create and record in excess of 10,000 folders and data files, but these recorded files cannot be copied or reproduced.

Operations to control recording


Operations to control recording

When you choose **File** and **New**, and then select the recording device and the file name, the mode becomes the recording mode and you can start recording.

The following procedure shows how to record two IDs. Also, during recording, we will mark data by adding event marks to the data.

1. Ensure that the mode shown in the status display is RECORD. If it is VIEW, click the REC button on the far left of the window to change the mode to RECORD.

2. If data is saved automatically to the media after the recording to memory stops (that is, **Auto Saving** is selected), or when recording to the media, ensure that the media is inserted.


3. Click the  button on the toolbar. Alternatively, press the **REC** button on the main unit.

The action display will show RECSTANDBY, and the input waveform will be displayed in the waveform display area.


4. After 3 seconds, click  on the toolbar. Alternatively, press the **FWD** button on the main unit.

The action display will show REC and recording will start.

When recording to memory or recording to the media, the USAGE LEDs show the percentage of the total capacity used.

5. Click  on the toolbar. Alternatively, press the **EVENT** button on the main unit.


The display of the event mark count will show 0001. The number of scans at this instant is recorded in the header file. The scan numbers are recorded on the header file. If a new event mark is not separated by the previous mark by 2 or more seconds, the mark is not valid.

6. Click  on the toolbar. Alternatively, press the **PAUSE** button on the main unit.

The recording of the first ID ends, and the system enters the pause status.

The action display shows RECSTANDBY.

When recording to the media, you cannot perform another recording until the system has finished writing to the media.

7. Click  on the toolbar. Alternatively, press the **FWD** button on the main unit.

The recording of the second ID will start.

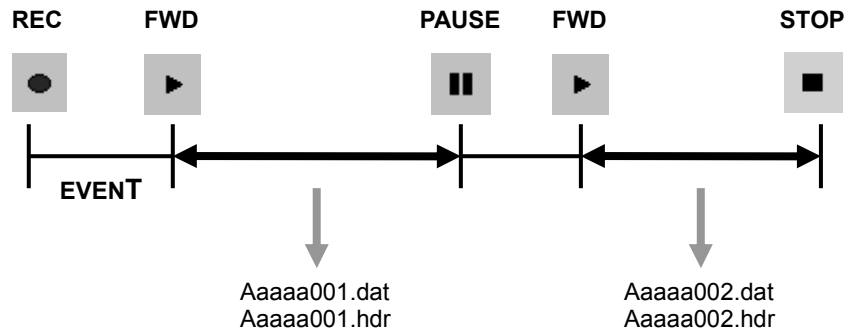
8. After 3 seconds, click  on the toolbar. Alternatively, press the **STOP** button on the main unit.

The recording will stop.

9. When you are recording to memory, the message “**Do you copy data?**” is displayed. If you click **Yes**, the **Copy** dialog box is displayed. Use this dialog box to copy the data to the media or PC. (See the next page for details.) If you again record data or power off the main unit before copying, the data in memory will be lost. Alternatively, the data in memory will be lost if you playback.

If you have selected the **Auto Saving** option (after choosing **File** and then **New**) and the media has been inserted, the above message will not be displayed and the data in memory will be automatically saved to the media.

The above procedure records the files shown in the following diagram.



Exchanging Media

■ When Recording to Media

When the media becomes full during recording, a message will be displayed and the recording will stop. The file up to that point has been completed. You can then replace the media and restart recording.

■ When "Auto Saving" Is Selected

When the media becomes full during copying, a message will be displayed and copying will stop. The file up to that point has been completed. If you then replace the media, the remaining data will not be copied automatically. In such a case, use the **Copy** dialog box to copy the remaining data. After replacing the media, you can again start to record.

■ Directory and ID Number After Media has been Replaced

On the new media, the system will make the directory specified in the **New** dialog box and use the specified file name. However, the ID number will again begin from 1. Also if the directory or file name specified in the **New** dialog box already exists on the media, the last ID number is incremented by 1 and the new sequential ID number is used.

Copying

Copying

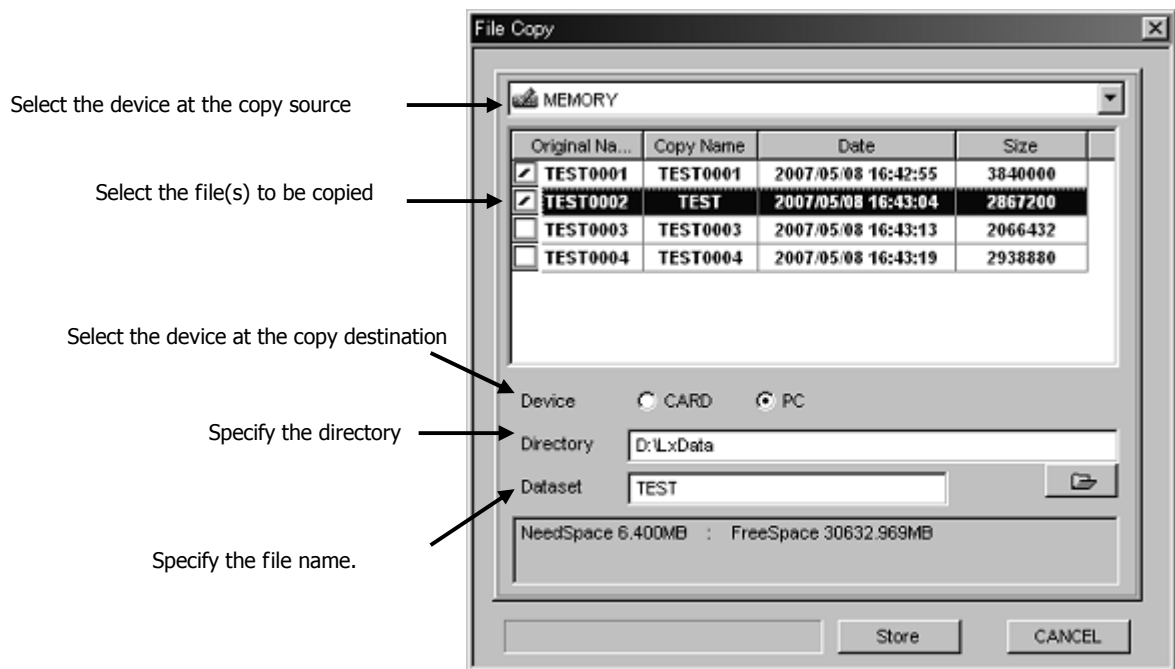
Recorded data files can be copied in the following three directions:

Memory to Media

Memory to PC

Media to PC

■ When a data file is copied, the header file paired with the data file and also the voice memo file are copied at the same time.



1. From the **File** menu, choose **Copy**.
2. Select the copy source device or folder to be copied.
3. Select the data file to be copied by turning the check box of the data file ON.
4. In **Device**, click **CARD** to copy to the media and click **PC** to copy to the PC.
5. In **Directory**, specify the copy destination directory.
6. Click **Store**.

■ If you are copying from memory, the data will remain in memory even after the copying has finished, and so the USAGE LEDs will remain lit.

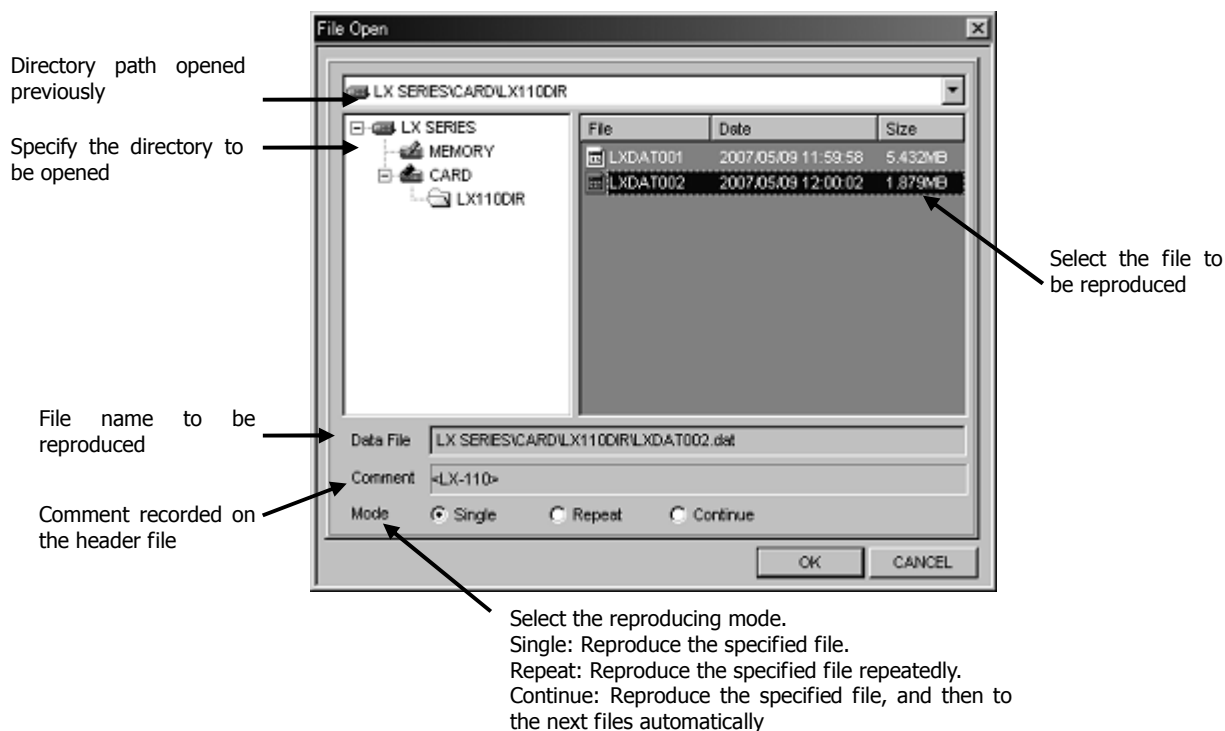
■ When changing a file name, click the file that you want to change. The file will be highlighted. In **Dataset**, type the name of the file after the change. The name of the file after the change is displayed in **Copy Name**. (This takes effect when copying the file on the PC))


■ The DATASET in the copied header file keeps the original file name. See "File Format" in Section 6 "Specifications" for details of the header file.

- The total number of folders and data files that can be created on a PC Card and operated correctly is 10,000. You can create and record in excess of 10,000 folders and data files, but, these recorded files cannot be copied or reproduced.

Reproducing

You can reproduce data that has been recorded to memory or media.



1. From the **File** menu choose **Open**.
2. Select the file to be reproduced.
3. Click **OK**. (The mode in the status display becomes VIEW.)
4. Click  on the toolbar. Alternatively, press the **FWD** button on the main unit. The action display changes to PLAY, and reproduction begins.

■ Changing the Reproduction Rate

You can reproduce data at a different rate from the recording rate. To change the rate, first open the file by following the steps described above, and then change the **Sample** setting on the left of the main window, or from the **Setup** menu choose **System** and then change the **Sample** setting.

Changing the reproduction rate does not change the sampling frequency setting for recording.

The rate of voice memo reproduction is not changed even when the **Sample** setting is changed. In this case, the data and the voice do not synchronize.

Changing the reproduction rate is possible within the same sampling frequency series.

Reproducing

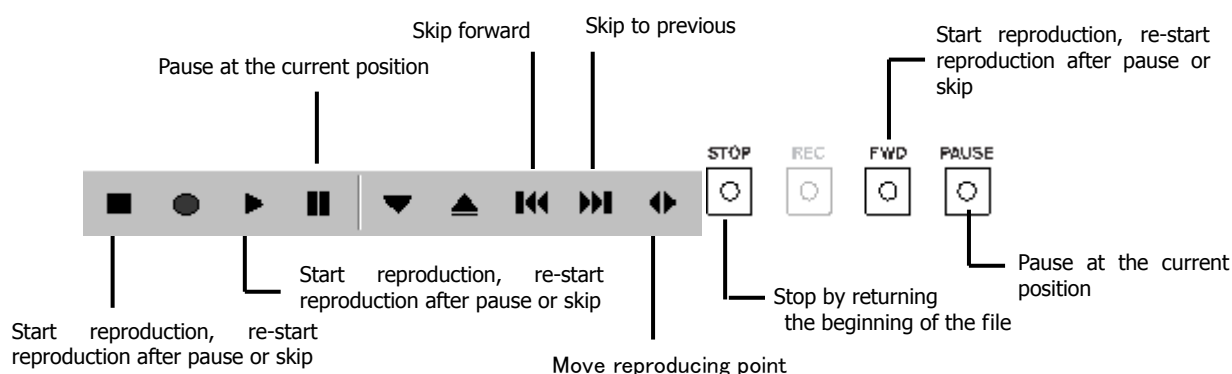
You cannot use the monitor output of the analog signal when reproducing at the low-speed sampling series (1 kHz to 1/60 Hz). When you use the analog output at the output amp, it is necessary to buy an optional unit.

The total number of folders and data files, which can be created on a PC Card and operated correctly, is 10,000. You can create and record in excess of 10,000 folders and data files, but, these recorded files cannot be copied or reproduced.

Operations to control reproduction

At the LX Navi

At the LX main unit



■ The skip functions are available during a pause or in the stopped status. For details, see the next topic.

Moving Reproducing Point (Skip)

Skipping enables you to move the reproduction point. The skip function is available in the paused or stopped status. When you click the button, the reproduction point moves from its current location to its previous location. When you click the button, the reproduction point moves from the current location to the following point. (Display of a waveform is from the start or restart of reproduction after a skip.)

You can specify the range of the movement by one click.

To specify the range of the movement click on the toolbar. The following dialog box is displayed.



Total number of scans of the current file, etc

You can select from the following 4 options:

File

Moves from the current file to the older file (determined by ID number) in the same folder.

Scan

Moves the specified number of scans only. When you select **Scan**, the lower box displays the total number of scans of the current file.

Mark

Moves to the preceding or following event mark. When you select **Mark**, the lower box displays the total number of event marks in the current file.

Time

Moves the selected time (hours:minutes:seconds). When you select **Time**, the lower box displays the time when recording to the current file started, and the time when recording to the current file ended.

Advanced search

You can narrow searches by using the status display area.

1. With the View mode set in the paused or stopped status, click on any of the status-display boxes indicated by arrows in the following diagram. After the color of the characters changes, click again.



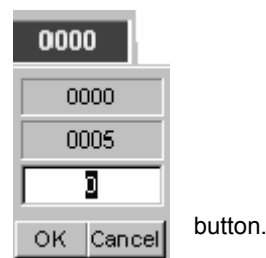
2. Specify the goal of the search.

Event search

Searches for the specified event mark.

The upper 2 boxes show the range of values that can be searched.

Enter the number to be searched and click the “OK”

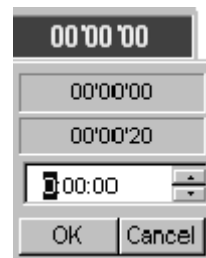


Count search

Searches for times (hours:minutes:seconds) from the start of recording.

The upper 2 boxes show the range of values that can be searched.

Enter the time to be searched and click the “OK” button.



Time search


Searches using your specified recording date and time.

Enter the date (year/month/day) and time (hour: minute: second). The upper 2 boxes show the range of values that can be searched.

Enter the date to be searched and click the “OK” button.



3. After specifying the goal of the search, click the “OK” button to close the dialog box. At the goal point, the system enters the stopped status. To cancel the searching operation, click the “Cancel” button to close the box.

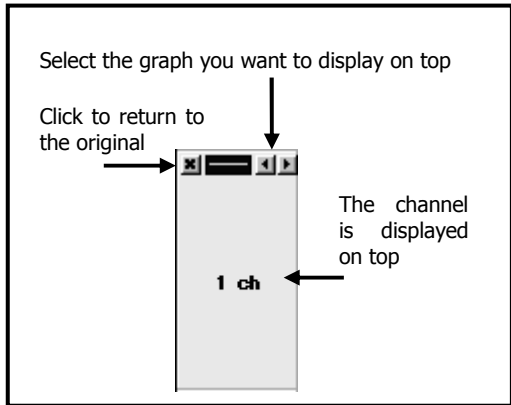
4. Click  on the toolbar. Data is reproduced starting from the goal point.

Convenient Features

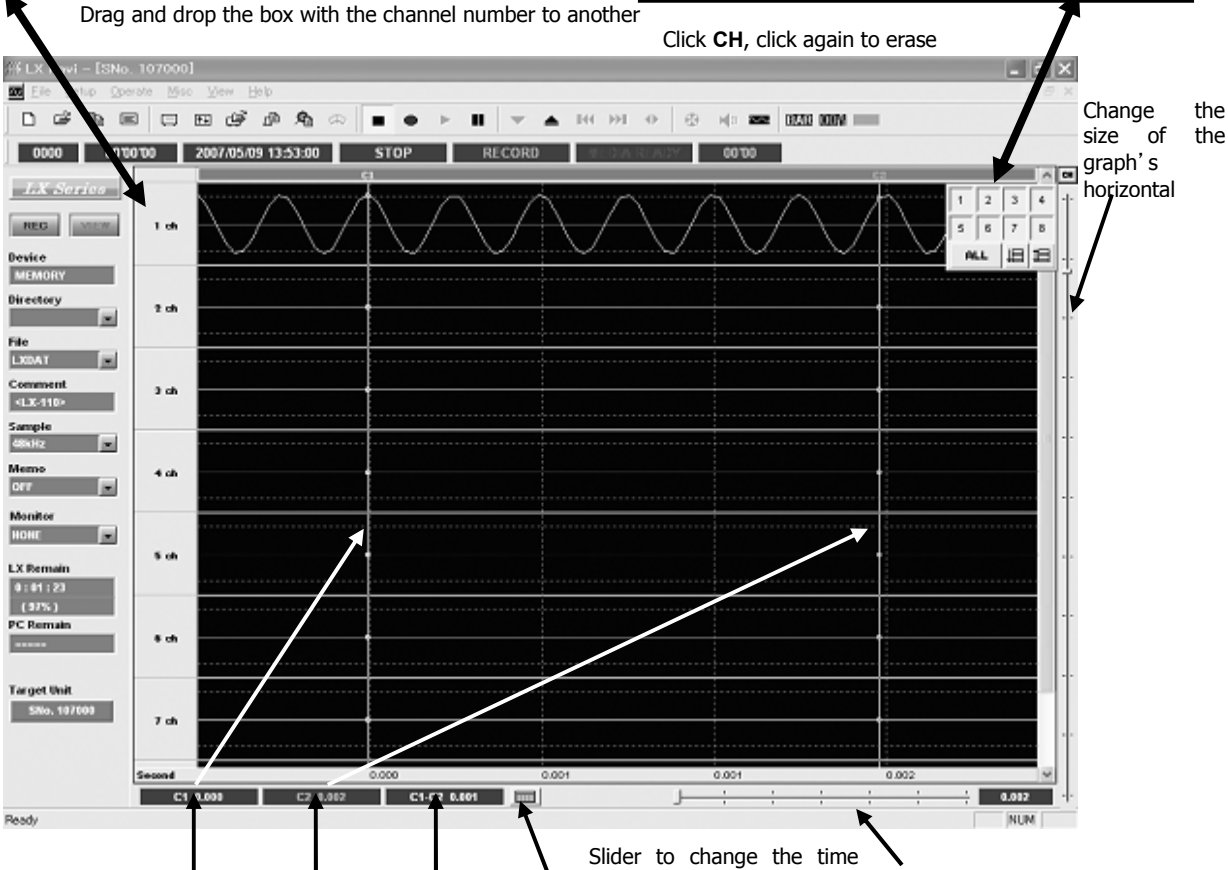
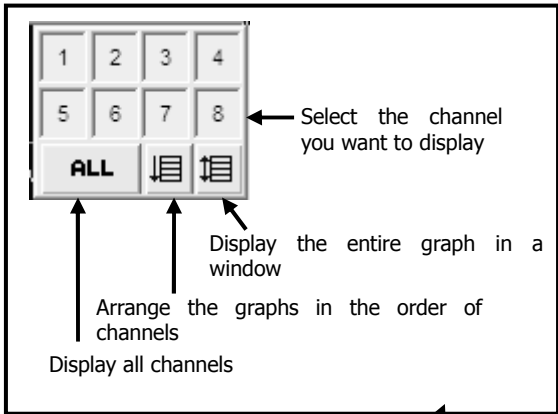
Convenient Features Displaying Waveform

You may see the decimated plots on the viewing waveform depending on the sampling frequency settings and/or the display time scale.

View overlapping waveforms



Select the channel to display



Display the time axis grid of the cursor location. C1-C2 is the time difference. During a pause, you can move this by dragging the cursor

Click here to display the list on the next page, click again to erase

Sampling Frequency	Display Period
1.5 kHz	Up to 10 s
3 kHz	Up to 5 s
6 kHz	Up to 2 s
12 kHz	Up to 1 s
24 kHz	Up to 500 ms
48 kHz	Up to 200 ms
96 kHz	Up to 100 ms
(In case 1.5 kHz to 96 kHz sampling	

Channel Property

Value of cursor position Differences between 2 cursors

Channel	Range	DispRange	Offset	Cursor (C1)	Cursor (C2)	Abs (C1-C2)	Channel Name
1 ch	2.00000V	2.00000V	0.00000V	0.00000V	0.00000V	0.00000V	LX-110_DC100K
2 ch	2.00000V	2.00000V	0.00000V	0.00000V	0.00000V	0.00000V	LX-110_DC100K
3 ch	2.00000V	2.00000V	0.00000V	0.00000V	0.00000V	0.00000V	LX-110_DC100K
4 ch	2.00000V	2.00000V	0.00000V	0.00000V	0.00000V	0.00000V	LX-110_DC100K
5 ch	2.00000V	2.00000V	0.00000V	0.00000V	0.00000V	0.00000V	LX-110_DC100K
6 ch	2.00000V	2.00000V	0.00000V	0.00000V	0.00000V	0.00000V	LX-110_DC100K

Double click the desired channel

Coefficient value and units

Unit conversion expression

Channel name

Graph line color

Graph color background

Offset value

Return default to the

Return default to the

Change the display range

Reset the graph color settings to the default

Channel Property 1 ch

Unit name and coefficient value.
 =

Channel name

Offset value

Disp range

Line color

Back color

Converting Units

You can use engineering units, instead of the physical units to be written in the VERT_UNITS line of the header file. The coefficient (SLOPE value) is converted accordingly and written in the header file.

In the above dialog box, the entered conversion expression is for the situation in which you are recording a signal from an acceleration sensor outputting an acceleration of 9.8 m/s² by 1 V. If the offset value exists for input of 0V, enter the Offset Value. When these are changed, the units for VERT_UNITS and the SLOPE and Y_OFFSET values in the header file will change.

Convenient Features

Disp Range

Dragging the slider changes the waveform graph range.

Channel Name

You can name each channel.

Line Color

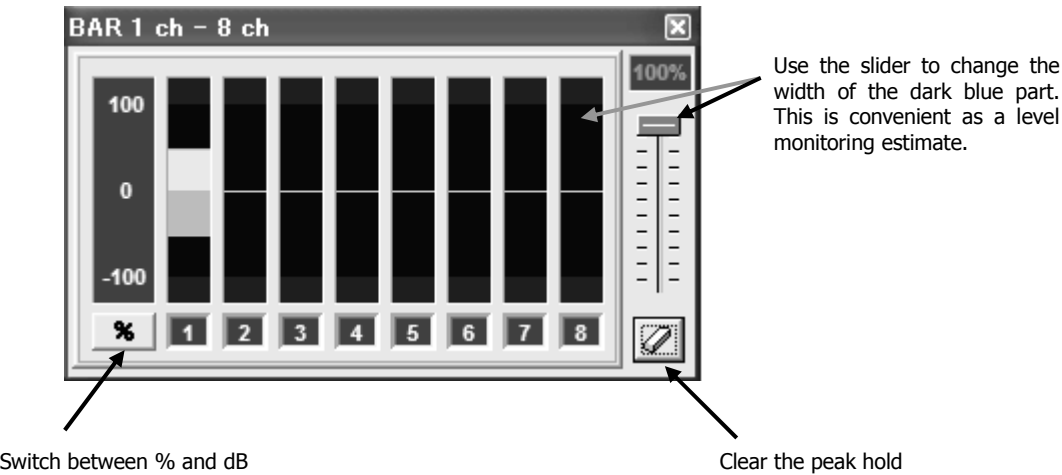
Selects the color of the graph lines. Clicking **Same** changes the graph lines of all graphs to the same color.

Back Color

Select the background color of a graph. Clicking "**Same**" changes the background of all graphs to the same color.

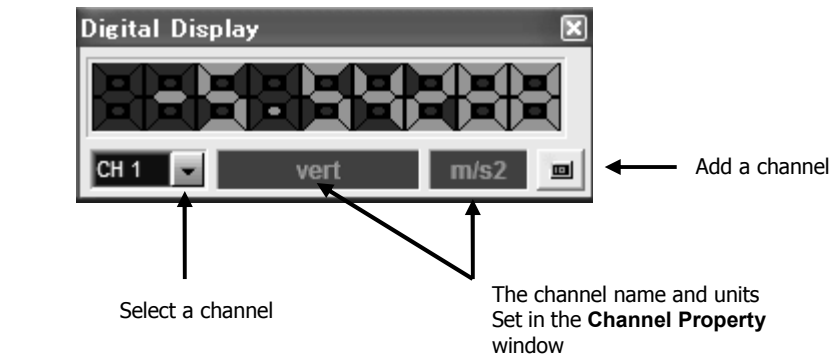
Displaying Bar Meter

To display the bar meter, choose **View** and then **Bar**.



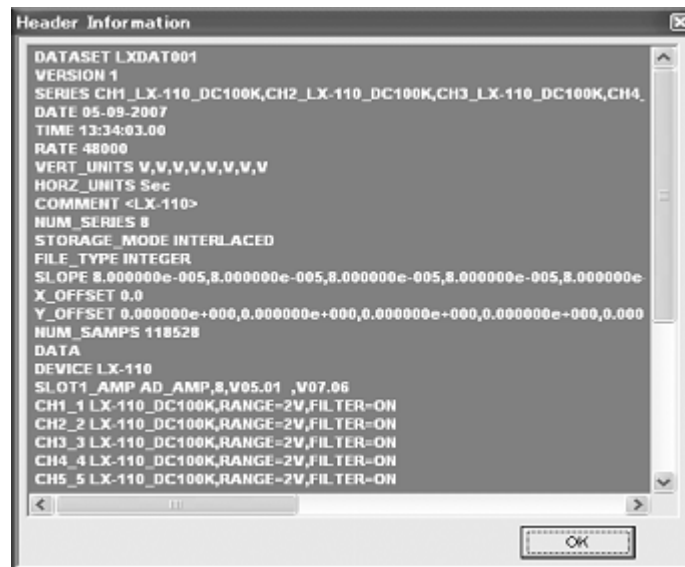
Displaying Digital Values

To display digital values, choose **View** and then **Digit**. The number of displayable digital values is the same as the valid number of channels, including tachometer input channels.



Viewing Header Information

To display header information, choose **View** and then **Hdr**. This takes effect after you select a file in the View mode.



Convenient Features

Changing Modes

In the lower left of the main window, you can see the recording device and the file name, and select the file to reproduce.

Switch between the recording mode and view mode

<In Recording mode> <In View mode>

Display the storage location and file name

Select the file to be reproduced

Comments written using File and New

Select the sampling frequency

Select the voice memos ON or OFF

Select the monitoring channel

Period recordable on the selected device (hours:minutes:seconds)
※Notes 1

Remaining free space of the selected device (%)

Period recordable on the PC (hours:minutes:seconds)
※Notes 2

The serial number or recorder name of the target unit

REC VIEW

LX Series

Device
MEMORY + (PC)

Directory

File
LX10_

Comment
<LX-10>

Sample
24kHz

Memo
OFF

Monitor
NONE

LX Remain
0 : 10 : 52
(100%)

PC Remain
28 : 08 : 32

Target Unit
SNo. 107000

Comment written in the file being reproduced

Select the reproducing rate

Condition of voice memos ON/OFF saved on the file to be reproduced

Select the monitoring channel

※ **Notes 1:** If the remaining time is displayed in cyan color, it indicates that the media has a free space of 4GB or more and that the actual remaining time is much longer than the displayed time.

※ **Notes 2:** If the data transfer speed is low, this item is displayed in yellow or red and it indicates that data transfer to the PC is delayed. In such a case, the memory in the LX main unit might become full and the recording might finish earlier than the recordable time that is being displayed.

Stopping Fan

You can stop the cooling fan on the LX by clicking the fan button on the toolbar. (If you have already stopped the fan and recording of data, wait for about 10 minutes before you again stop the fan and record.) This button behaves differently depending on the **Fan** setting in the **System** dialog.



When the **Fan** is set to **ON**

The fan button is enabled after the recording-standby status is established. By clicking the button you can stop the fan from that moment until you click it again. You can repeat this until the total fan-stop time is 10 minutes. The remaining fan-stop time is shown on the status display.

When **Fan** is set to **OFF**

The fan button is enabled only during the recording-standby status. By clicking the button you can stop the fan only once for a maximum of one minute. The remaining fan-stop time is shown on the status display. After you start recording, the fan button is disabled and the cooling fan is stopped for 10 minutes.

Listening to Data by Sound

You can play back the data of the monitored channel as sound by clicking the speaker button on the toolbar. When you click this button during reproduction, the data of the monitored channel instead of a voice memo is played back from the speaker.



Contents of Displayed Message

Contents of Displayed Message

Type	Displayed Messages	Meanings	Actions to be taken
INF	Succeeded to adjust time.	Succeeded in updating the date and time	Confirm the date and time displayed
QUE	Do you adjust time on LX with PC clock?	Do you wish to adjust the time on the LX with the PC clock?	Select the "Yes" button to adjust the time on LX with the PC clock.
QUE	Do you copy data?	Do you wish to copy data?	Select the "Yes" button to save recording data on media or PC.
QUE	Do you set file name?	Do you wish to specify the file name? (For copy operation)	Select the "Yes" button to specify file name to continue the copy operation.
QUE	There is same path name. Do you overwrite data?	The same file name already exists. Do you want to overwrite the file?	Select the "Yes" button to overwrite the file with the same name.
WAR	Cannot find amplifier unit.	Amplifier is not installed.	Confirm that the amp is installed properly and restart the LX main unit.
WAR	Cannot reproduce this file.	Cannot reproduce this file	This file includes attribute data, which cannot be reproduced.
WAR	Check Start PreTrig Value.	Check the pre-trigger value	Check the pre-trigger setting and change it.
WAR	Couldn't close this application. Please set REC (IDLE) MODE.	Couldn't close this application. Make the recording mode idle.	Make the recording mode idle and close the application.
WAR	Device Not Selected.	The device is not selected as the copy destination.	Specify the device as the copy destination and restart again.
WAR	Failed to create new file. Please confirm the file path.	Failed to create new file. Confirm the file path name.	Failed to create new file. Confirm the specified file path name and that the device are writable, and restart again.
WAR	Failed to perform zero balancing. Please confirm a result.	Failed to perform zero balance. Confirm the result in zero balance window.	"NG" is displayed on one or more channels as a result of zero balance. Open the start zero balance window to confirm the channel with "NG" and restart again. The channel with open status might result in "NG".
WAR	File increment number overflow. Move a figure some place to the left.	The file increment number has overflowed. Specify to increase the number of digits in the ID number	The number of the file number is reaching the upper limit. In order to increase the number of digits in the ID number, specify it and start again.
WAR	Input parameter is invalid.	The input parameter is invalid	Modify the parameter with the cursor.
WAR	Low battery. Please close this application.	The battery voltage is low. Close this application.	The power of the LX main unit might be turned off. Close the running task to finish the application.
WAR	LX Dataset name is invalid.	The file name of the media is invalid.	Confirm whether or not the file name of the LX media for recording includes prohibited characters and change them if required.
WAR	LX Directory name is invalid.	The Directory name of the media is invalid.	Confirm whether or not the directory name of the LX media for recording includes prohibited characters and change them if required.
WAR	Media full.	The media installed in LX main unit is full.	If you keep recording further, replace the media with a new one.
WAR	Media Not Ready.	Media is not ready. Cannot enter REC STANDBY.	Confirm to install media and the status enters "Media Ready". Then, start to run.

Contents of Displayed Message

WAR	Media UnFormat.	Media not formatted. Cannot enter REC STANDBY.	Format media and start to run.
WAR	Media Write Protected.	Media is write-protected. Cannot enter REC STANDBY.	Release the write-protected media and use it.
WAR	Memory full.	The memory in the LX main unit became full.	Recording has finished. Save the recoding data on media or PC using copy function as required.
WAR	Media Not Ready.	No media for writing parameter file.	Install the media on the LX main unit.
WAR	Parameter file is invalid.	Contents of parameter file are invalid.	Reproducing cannot be done since the header file is invalid.
WAR	PC Dataset name is invalid.	File name of PC is invalid.	Confirm whether or not the file name of the PC for recording includes prohibited characters and change them if required.
WAR	PC Directory name is invalid.	Directory name of PC is invalid.	Confirm whether or not the directory name of the PC for recording includes prohibited characters and change them if required.
WAR	Please install update Program KB885222 of Microsoft.	Install Microsoft's Update program KB885222.	Finish LX Navi, install Microsoft's update program KB885222, and restart LX Navi again.
WAR	Please set file name.	Specify the file path name.	Specify the file path name and finish.
WAR	This file can't be selected.	Cannot select this file.	The data file(*.DAT) does not exist. Confirm the media.
WAR	This unit has been Slave Mode.	Cannot operate in slave mode.	The operation cannot be done in slave mode.
WAR	The setting of the LX inside was initialized.	The setting in LX main unit has been initialized.	The setting saved in the LX main unit has been initialized. Confirm and create settings again. The setting is initialized by change of amp unit.
WAR	There is not enough disk space.	There is not enough disk space on PC.	Increase the disk space of the specified PC or change the specified disk in the PC.
ERR	Cannot Close LX SERIES.	Cannot close LX Series.	The logoff process of LX main unit does not function when closing application. In case such status happens repeatedly, please contact TEAC.
ERR	Cannot Close LX SERIES.	Cannot open LX Series.	Confirm that another LX Navi has been running already. If not running, turn the LX main unit off/on to restart it.
ERR	error code (n). This application is closed automatically.	Command execution error has occurred. Close the application.	Confirm that the interface cable, etc., is connected properly, and restart to run. If this happens repeatedly, please contact TEAC.
ERR	Size of command parameter is invalid.	Parameter size of command is invalid.	Confirm the interface cable, etc., is connected properly, and restart to run. If this happens repeatedly, please contact TEAC.
ERR	Failed to Calibration of Slot (n).	Failed to calibrate of slot (n).	Turn off/on the LX main unit to restart it. If this happens repeatedly, please contact TEAC.
ERR	Failed to Calibration.	Failed to calibrate.	Turn off/on the LX main unit to restart it. If this happens repeatedly, please contact TEAC.
ERR	Failed to get catalog data.	Failed to get catalog data (file information of media).	Confirm that the installed media is not in an improper state.

Contents of Displayed Message

ERR	Failed to make a new folder.	Failed to make a new folder on PC.	Failed to create the directory of record/copy-destination. Confirm that the specified file path name and the device are writable, and restart.
ERR	Failed to read file. (xxxx)	Failed to read file.	Failed to read file. Confirm that the specified device is ready.
ERR	Failed to read file. (xxxx)	Failed to write file.	Failed to write file. Confirm that the specified device is in a writable state.
ERR	Failed to Zero Balancing.	Failed to execute zero balance.	Turn off/on the LX main unit to restart it. If this problem happens repeatedly, please contact TEAC.
ERR	Get LX Information Error.	Failed to get information of LX main unit.	Turn off/on the LX main unit to restart it. If this happens repeatedly, please contact TEAC.
ERR	Illegal MAC Address (n).	MAC address is illegal.	Contact TEAC. (MAC address is illegal.))
ERR	Media Access Error.	An error occurred in accessing media in LX main unit.	Use new media instead of this one.
ERR	Please set MAC Address.	Set MAC address.	Contact TEAC. (MAC address is illegal.)

Messages

INF	Contents of information
QUE	Conforming selection of operations
WAR	WARNING
ERR	Error

LX Stand-alone Operations

Create a setting of the recording device, file name, and others in LX Navi before starting to record. The last settings specified by LX Navi are stored in the LX main unit even if the power is turned off. When the LX is removed from the PC, the LX operates according to those settings.

■ Cautions on Operating as a Stand-Alone Device

IEEE 1394 enables hot-pluggable connections, so that the LX main unit can be connected or disconnected while the PC is powered on. (However, do not disconnect the LX main unit while it is communicating with the PC.) When the LX main unit is disconnected, LX Navi outputs an error message and terminates. In such a case, if you reconnect the LX main unit and restart LX Navi, the LX main unit can again be recognized.

When moving the LX main unit, remove the media before turning off the power. Moving the unit while the media is inserted may result in damage.

When media recording, ensure that the media is inserted before the recording starts. If no media is inserted, the recording cannot start. (The REC button has no effect.)

When recording to memory, after recording stops and while the power is still turned on, connect to a PC and copy the data to the media or the PC. If you record data again, or power off the main unit before copying, the data in memory will be lost. If you again record data or power off the main unit before copying, the data in memory will be lost.

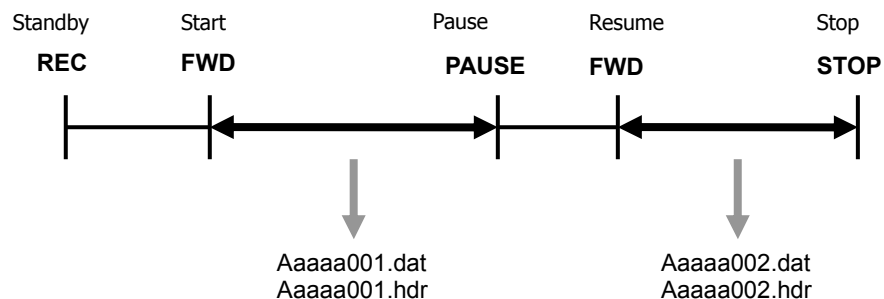
When recording to memory using LX as a stand-alone device, do not select the Auto Saving option (**File**, **New**, and then **Auto Saving**). When recording to memory, the system does not know how much free space is left on the media and so there is a danger that some data might be lost when saving. Also note that, even if the **Auto Saving** option is selected, powering off the LX resets this option to the disabled status.

LX Stand-alone Operations

Recording to Media

1. Insert the media in the LX.
2. In the LX Navi, choose **New** from the **File** menu.
3. Select the **PC CARD** as the recording device, specify the directory and file name, and then click **OK**.
4. Eject the media, and terminate the LX Navi.
5. Power off the LX, remove the IEEE 1394/LAN cable from the rear, and move the LX to the place where you want to take measurements.
6. Power on the LX and insert the same media.
7. Press the REC button and then the FWD button. The recording will start.
8. Press the PAUSE button. The recording will pause. Recorded data will be grouped into one ID. After this, whenever the FWD and PAUSE buttons are pressed, an ID will be recorded, and the ID numbers will be incremented automatically.
9. To stop recording, press the STOP button.
10. When writing to the media is finished, the eject button can be used. When moving the main unit, push the PC Card eject button to remove the media manually.

■ After the above, if you turn off the power and then turn it back on and record to the same media, the ID number will be automatically incremented and data will be recorded to the same file name. In the example of the diagram below, the file will become Aaaaa003.



■ When the media becomes full

When the media becomes full during recording, the recording stops and the data up to that point is made into a file. You can then replace the media and restart recording. If you are using the LX as a stand-alone device, you cannot format the media. So, prepare formatted media beforehand. On the new media, the system will cause the directory to appear in the **New** dialog box and will use the specified file name. However, the ID number will again begin from 1. Also, if the directory or file name specified in the **New** dialog box already exists on the media, the last ID number is incremented by 1 and the new sequential ID number is used.

Recording to Memory

When recording to memory while using LX as a stand-alone device, keep the LX powered on after recording stops, connect to a PC, and transfer the data in memory to an MO disk or the PC.

1. In the LX Navi, choose **New** from the **File** menu.
2. Specify the memory as the recording device, specify the file name, and then click **OK**.
3. Terminate the LX Navi.
4. Power off the LX, remove the IEEE 1394/LAN cable from the rear, and move the LX to the place where you want to take measurements
5. Power on the LX main unit.
6. Press the REC button and then the FWD button. The recording will start.
7. Press the PAUSE button. The recording will pause. The recorded data will be grouped into one ID. After this, whenever the FWD and PAUSE buttons are pressed, an ID will be recorded, and the ID numbers will be incremented automatically.
8. To stop recording, press the STOP button.
- Take care in this situation because the data in memory will be lost if you again press the REC button, start reproducing, or power off the LX. If you again record data or power off the main unit before copying, the data in memory will be lost.
9. Use an IEEE 1394/LAN cable to connect to the PC.
10. Start the LX Navi.
11. From the **File** menu choose **Copy**, and copy the data that was recorded to memory to the PC.

■ When recording to memory using LX as a stand-alone device, do not select the Auto Saving option (**File**, **New**, and then **Auto Saving**). When recording to memory, the system does not know how much free space is left on the media and so there is a danger that some data may be lost when saving. Also note that, even if the **Auto Saving** option is selected, powering off the LX resets this option to the disabled status.

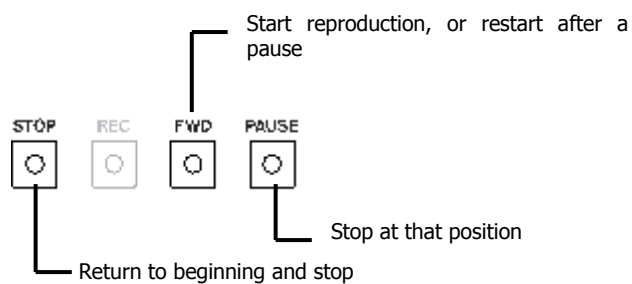
LX Stand-alone Operations

Reproducing

Even when using the LX as a stand-alone device, you can reproduce and output the last data (last ID) recorded to memory or to the media. However, when the power is turned off, any data in memory will be lost and you will be unable to reproduce such data.

To reproduce data, press the FWD button on the front of the LX.

To pause while reproducing data, press the PAUSE button. To stop reproducing data, press the STOP button.



Recording Synchronization

This section explains the optional recording synchronization function of the LX multiple units. The LX Navi establishes a master unit and up to 3 slave units connected with the recording synchronization cable within the total of 10m (as of June 2007) for recording synchronization recording.

- You cannot use the IEEE1394 interface model and the Ethernet interface model mixed for the recording synchronization.
- If you use the IEEE1394 model of the LX and you need to update the LX Navi, update the device driver to the latest available release.
- Synchronized reproducing operation cannot be done, but a standalone reproducing operation of a master unit can be done.
- When recording, the same settings of sampling frequency, quantization bits number, and recording media (Memory, PC Card) should be applied for both of the master / slave units. Also, when controlling the master / slave units by one PC (starting to run multi-LX Navi for multi-PC for synchronization recording), specify the directory or file name without overlapping.
- Each trigger condition can be specified to the master unit only. Not to the slave unit.
- When controlling the master / slave units by one PC, the operation at a maximum sampling frequency, or the settings saving function of the LX Navi, might be limited in use.
- In the case of synchronization recording, start to run the LX Navi in the sequence of master unit, slave 1, slave2, ..., and quit them to terminate the LX Navi of master unit in the reverse of the starting order.
- Use the optional LX View PL-S1001 wave monitor software or the AFC NEO PL-S1002 file converter software to merge the multiple files recorded.
- Keep the numbers of the main windows open in the slave units to a minimum or the real time monitor cannot be processed, depending on the sampling frequency selected.
- Specify 5 sec or more as the interval to wait before recording (For media recording, many more seconds may be required).
- Take 30 sec or more to start recording after changing the sampling frequency.

Recording Synchronization

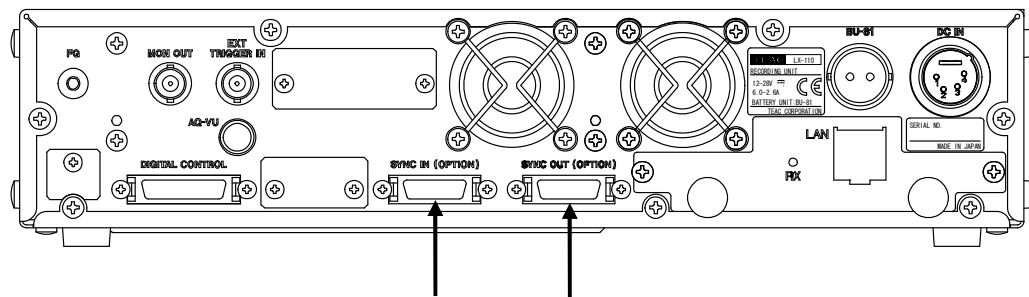
Settings and Recording Operations

Use the LX Navi menu of each master/slave unit for the amp and input range parameter settings, the sampling frequency, and so on. Make sure to use the same sampling frequency and recording media for the units to be recording synchronized.

Use the LX Navi of the master unit to start, pause, and restart the slave units, which follow these operations of the master unit.

Connecting Recording Synchronization Cables and Turning on Power

1. Connect the LX units to be synchronized by using the synchronization cables.



The <SYNCHRO IN> connector and the <SYNCHRO OUT> connector are used for recording synchronization.

Connect the <SYNCHRO OUT> connector of the first unit (master unit) to the <SYNCHRO IN> connector of the second unit (slave 1). If you have the third unit (slave 2), connect the <SYNCHRO OUT> connector of the second unit to the <SYNCHRO IN> connector of the third unit. Then connect another unit (slave N) accordingly.

2. In the case of IEEE1394 interface models, use the IEEE1394 cables to connect among the units in a daisy chain. Connect the PC LX Navi installed PC to one of the units.

In the case of the Ethernet interface model, connect the LX unit through the switching hub. Connect the LX unit and the LX Navi installed PC to switching hub.

3. Turn ON the powers of the LX units and then the PC.

Operations

You can set the master unit and the slave unit(s) by using the LX Navi.

1. Start to run LX Navi in PC and the information, such as serial number or etc of LX series, that are connected in the same segment, will be displayed on the LX selected dialogue (LX Network). Click the row of "sync select" in a sequence of master, slave1, slave2, ...The setting parameters will be displayed in the area where you clicked (This operation can be omitted the next time.) Click "Sync Check" button. Confirming / setting the synchronization settings of the specified LX and its confirmation test of synchronization connection will be conducted as above. The following figure shows that two units of the LX series are connected in the same group, and that the unit with the serial no.107100 and no.107366 are assigned as master and slave 1 for each (click the row of "sync select" in order of master, slave1, as you want. By clicking "Sync Check" at this time, the synchronization mode setting and the confirmation of the synchronization connection can be done.

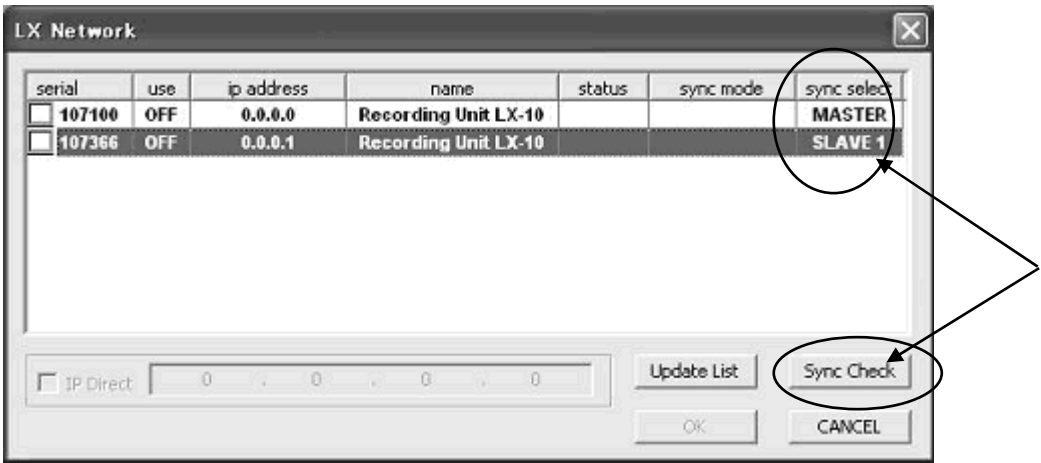


Table of LX selection dialogue (LX Network)

"serial"	serial number of the LX series recorder connected in the same segment
"use"	Indicates in-use state "ON" or not-in-use state "OFF"
"ip Address"	indicates the IP address
"name"	indicates the name set on the LX (IEEE1394 model is a fixed name)
"status"	indicates the connection status or the results of the confirmation test for the synchronization connection
"sync mode"	indicates the contents of the synchronization settings of the LX main unit
"sync select"	The order of master or slave unit (order of click) and their settings are displayed by the above figure for synchronization operation.

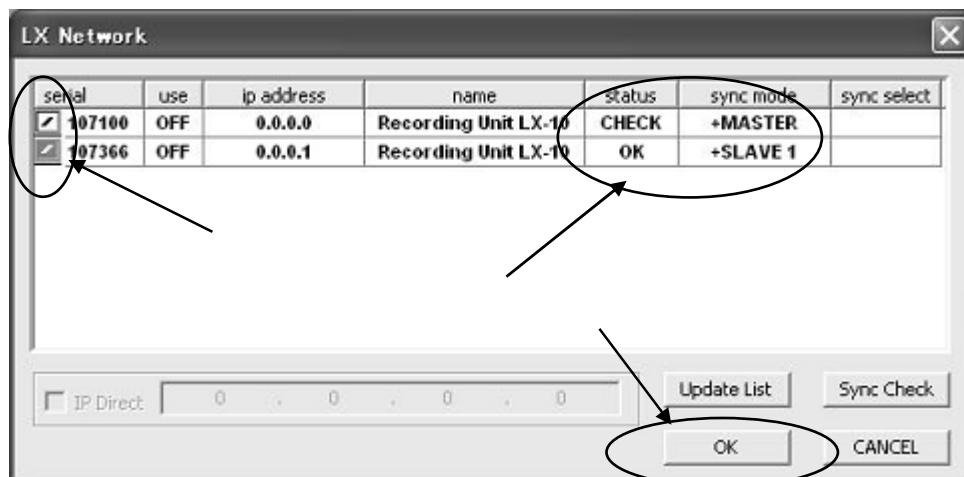
Recording Synchronization

Meanings of displayed item after starting the program and executing the "Update List"

Status of Check Box	status	sync mode	Meaning
Check Mark On			It is possible to run the unit (connected previously)
Check Mark Off			It is possible to select the unit for running
Red Check Mark On [grey background]	USE		Unit being used (It is not possible to select for running)
Check Mark Off [grey background]	IP ERR		IP address of the unit is out of a group (It is not possible to select for running)

2. The following figure results from clicking the "Sync Check" button. A check mark is added to the unit specified as a master unit, and a check mark with a grey background is added to the one specified as a slave unit. Confirm the check test of the synchronization connection and the turned-on check box, and then click the "OK" button.

The following figure shows that serial no.107100 and no.107366 are assigned as master and slave1 for each and that the synchronization connection was checked and found to be normal (The "status" of master unit shows "CHECK" and slave unit shows "OK"), and that the check box next to the serial no. has been turned on automatically. (The check box with the grey background means slave unit) By clicking the "OK" button at this time, the LX Navi begins to control the master unit.



Meaning of displayed items after clicking "Sync Check" button

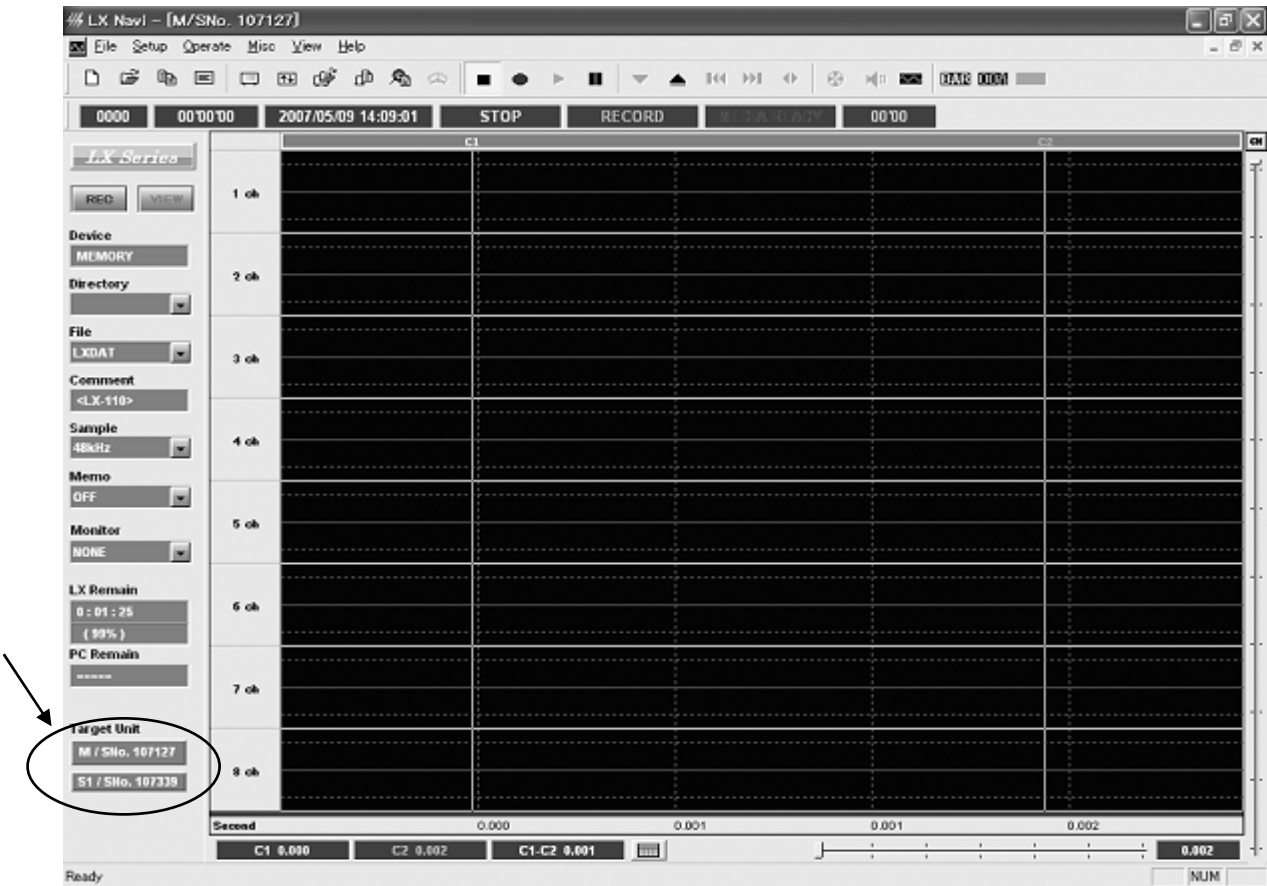
Status of Check Box	status	sync mode	Meaning
Check Mark ON	CHECK	MASTER	Master unit set for synchronization operation
Check mark ON [grey background]	OK	SLAVE n (n is slave no.)	Slave unit set for synchronization operation (connection test passed)
Check mark Off	NG	SLAVE n (n is slave no.)	Slave unit set for synchronization operation (connection test failed)
Check mark Off		NO SYNC	Standalone unit set
Check mark Off		NOT SUPPORT	Model not supported for synchronization operation Unit being used
Red Check mark On [grey background]	ERROR		An error has occurred
Red Check mark On [grey background]	(USE)		Unit being used
Check mark Off [grey background]	(IP ERR)		IP address of the unit is out of group

Once a setting parameter is changed, a "+" symbol is added to the displayed starting portion of "sync mode".
The "Sync Check" is not available for the unit being used or the one with out-of-group IP address.

Recording Synchronization

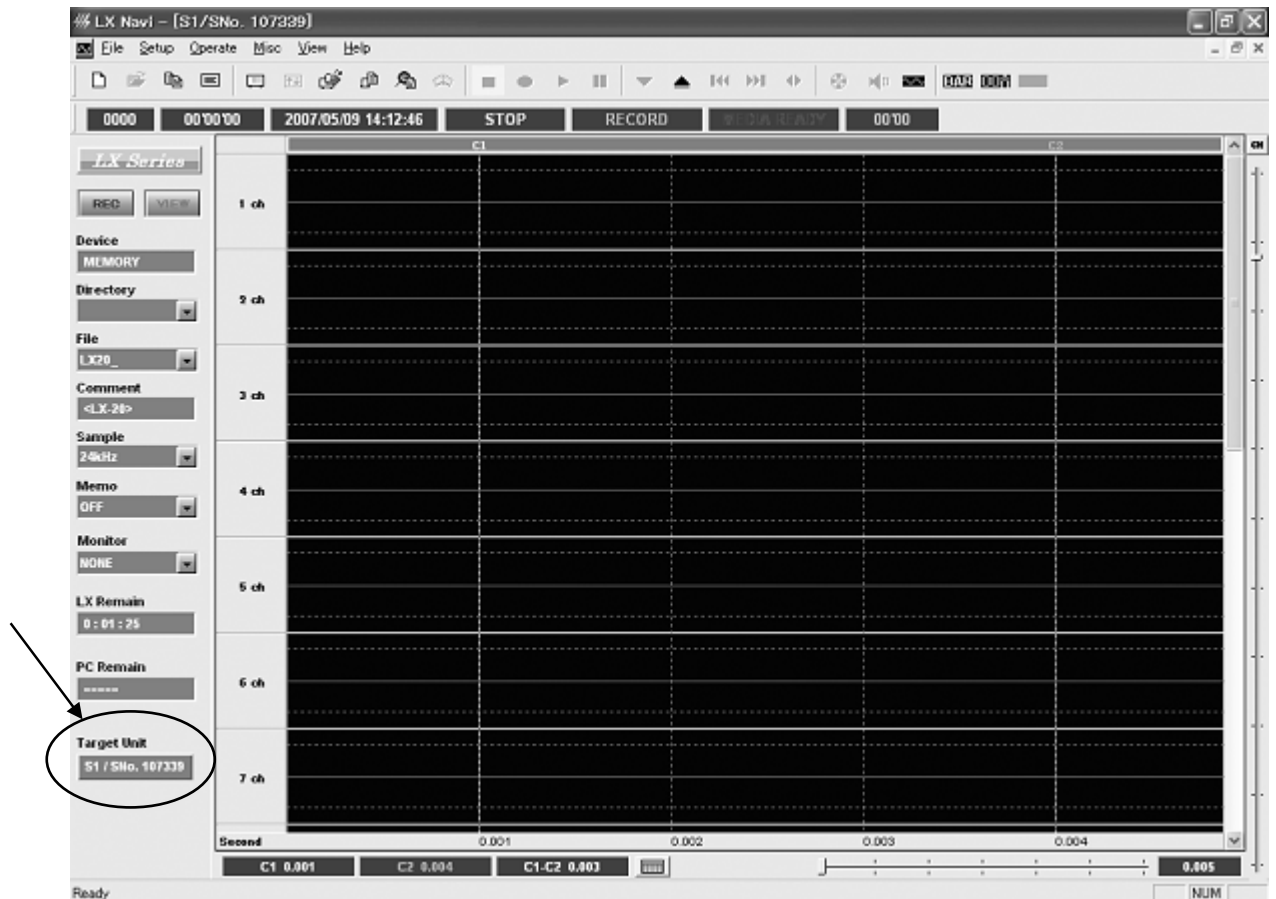
3. The LX Navi main window of the master unit is displayed. "M/name or serial number" at **Target Unit** in the left bottom of the window is displayed, and the main window belongs to the master unit. Also, the slave unit will be displayed under it as "S*/name or serial number".

Next, minimize the main window of master unit in order to begin to show the window of the LX Navi specified as a slave unit.



4. To show the window of the LX specified as a slave unit, start again to run the LX Navi on the PC to display the LX selection dialogue (LX Network) mentioned in Step 1. Then, click the box in <serial> field of the LX main unit specified as a slave unit, and click [OK]. (If the check box has a check-mark with grey background, click it twice to change it to a normal check-mark and click [OK].)

The LX Navi main window of the slave unit is displayed. "S*/name or serial number" at **Target Unit** in the left bottom of the window is displayed, and the main window belongs to the slave unit.



By the same operations, open the main window of the other slave unit that is connected. Set the recording parameters of the master and slave units one by one by maximizing and minimizing their main windows.

5. After setting the recording parameters of each unit, keep the main window open of the master unit and the necessary main windows of the slave units to be monitored. Close the unnecessary main windows of the slave units.

Operate the main window of the master unit to start and stop the recording synchronization of the multiple units.

6. To terminate the LX Navi, quit them in the reverse order of the starting order (slave N..., slave2, slave1, master).

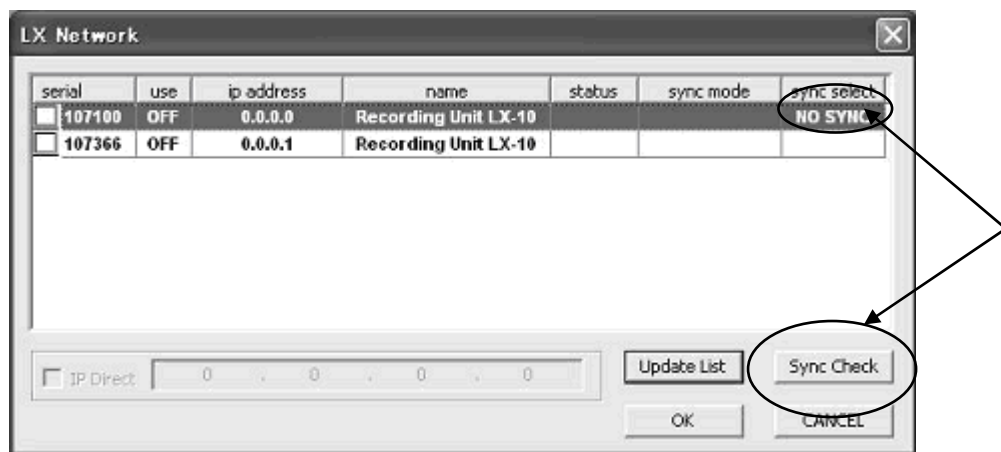
Recording Synchronization

Others

■ The LX Navi remembers the serial no. of the LX main unit which was operated previously. In such a case in which the LX main unit is connected in the same segment, displaying a check-mark initially, clicking the "OK" button only once will start the system.

■ As the LX Navi remembers the settings of the LX main unit's synchronization operation by one setting, confirming the sync. operation by only clicking "Sync Check" is required. (The selection of master / slave can be omitted on future occasions)

- To use the LX main unit, which is in synchronization setting, as a standalone operation unit (no sync, operation in normal), right click the "sync select" cell of the corresponding LX ("NO SYNC" will be displayed) to start the "sync check". Since the main unit remembers the settings by one operation, only



the normal starting procedure is required on future occasions.

■ The figure above indicates that the row of "sync select" has been right clicked to change the serial no.107100 from a synchronization operation to a standalone one. Now, click the "Sync Check" button.

In case the LX main unit, which has been created settings of synchronization, is used as a standalone operation without applying the settings above, the system might become to operate unstable. Make sure to perform the operations to change the settings to a standalone one.

■ While the LX selection dialogue (LX Network) is displayed, click the "Sync Check" button to display the result of confirming the synchronization connection in the item called "status". The "CHECK" is displayed on the master unit in which the synchronization connection is confirmed, and the "OK" is displayed on the slave unit to which the proper connection has been confirmed. In case "NG" is displayed on the slave unit, ensure that the synchronization connection cable has been connected properly, and click the "Sync Check" button again to confirm the synchronization connection.

■ To reconfirm the LX in the same segment after displaying the LX selection dialogue (LX Network), click the "Update List" button. (On the assumption that you have started to run the LX Navi and have turned on the LX, you should click the "Update List" button to reconfirm the LX in the same segment.)

Section 6 Specifications

Main Unit Specifications

Main Unit Specifications

Recording Media	PC card and memory, or memory
Capacity of Memory	64MB, add up to 576MB as option
Amp Slot	2 in the main unit
Interface	IEEE 1394-1995 compatible or 100BASE-TX LAN
Sampling frequency	(Value in brackets is the recording bandwidth with tolerances of +/-0.5 dB)

LX-110							
96~1.5 kHz	96 kHz (DC~40 kHz)	48 kHz (DC~20 kHz)	24 kHz (DC~10 kHz)	12 kHz (DC~5 kHz)	6 kHz (DC~2.5 kHz)	3 kHz (DC~1.25 kHz)	1.5 kHz (DC~625 Hz)

LX-120							
96~1.5 kHz	96 kHz (DC~40 kHz)	48 kHz (DC~20 kHz)	24 kHz (DC~10 kHz)	12 kHz (DC~5 kHz)	6 kHz (DC~2.5 kHz)	3 kHz (DC~1.25 kHz)	1.5 kHz (DC~625 Hz)
100~1 kHz	100 kHz	50 kHz	20 kHz	10 kHz	5 kHz	2 kHz	1 kHz
65.536~1.024 kHz	65.536 kHz	32.768 kHz	16.384 kHz	8.192 kHz	4.096 kHz	2.048 kHz	1.024 kHz
102.4~1.28 kHz	102.4 kHz	51.2 kHz	25.6 kHz	12.8 kHz	6.4 kHz	3.2 kHz	1.6 kHz

Low speed sampling series (1 kHz ~ 1/60 Hz)

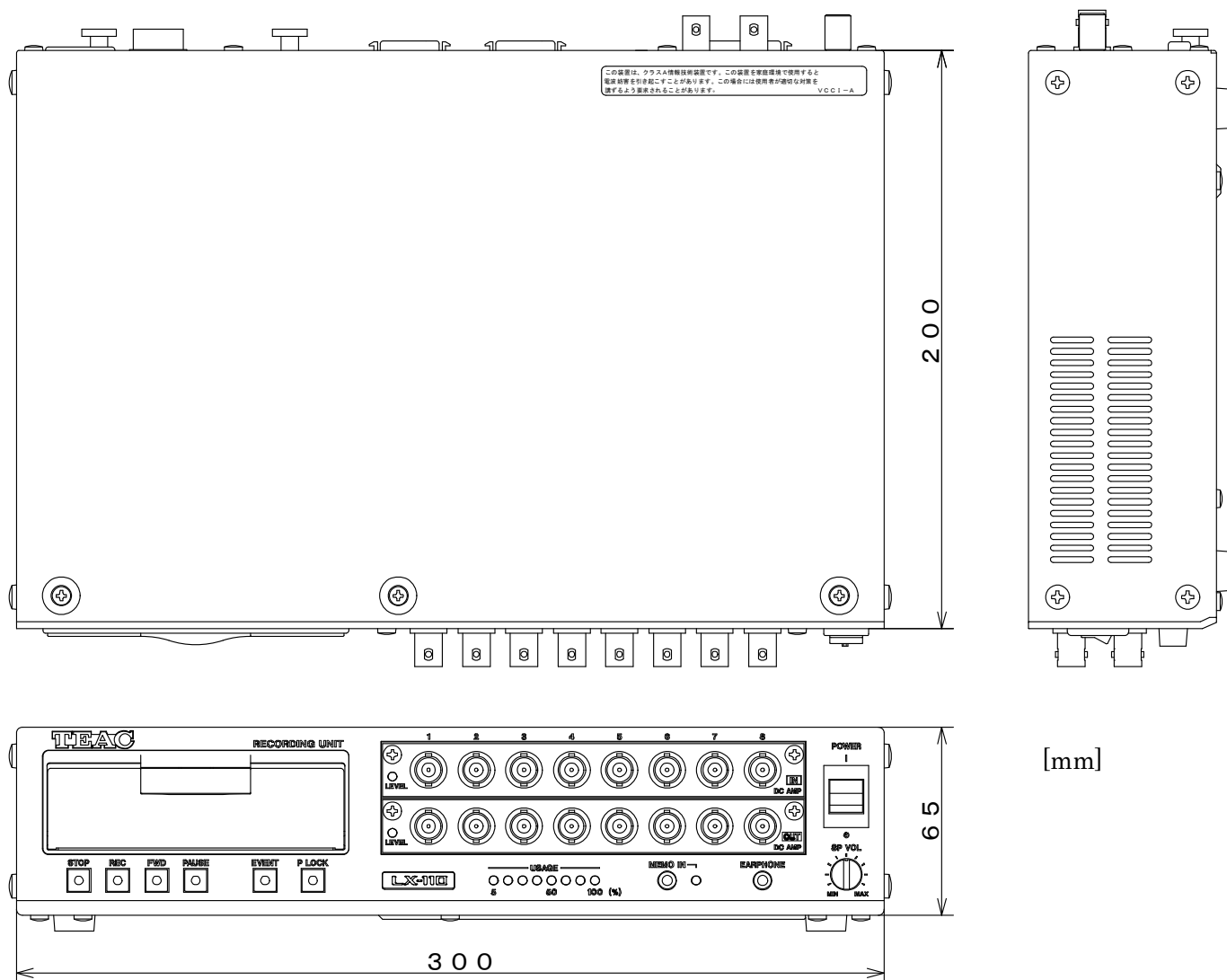
Conversion method 128 times over-sampling delta-sigma method, 2 kHz sampling

Digital Filter Characteristics Caused aliasing at 5 Hz or lower

Sampling Frequency (Fs)	Cut-off Frequency (Fc)	Attenuation
1 kHz	400 Hz	- 80dB (at 500 Hz)
500 Hz	200 Hz	- 80dB (at 250 Hz)
200 Hz	80 Hz	- 80dB (at 100 Hz)
100 Hz	40 Hz	- 80dB (at 50 Hz)
50Hz	20 Hz	- 80dB (at 25 Hz)
20Hz	8 Hz	- 80dB (at 10 Hz)
10Hz, 5 Hz, 2 Hz, 1 Hz, 1/2 Hz, 1/5 Hz, 1/10 Hz, 1/30 Hz, 1/60 Hz	4 Hz	- 80dB (at 5 Hz)

Voice Memo	Sampling frequency: 8 kHz, Quantization Bits: 8 kHz, WAV file
Internal Clock Precision	+/-1 ppm (at 25 degree C)
Operating Temperature	0~45°C
Storage Temperatures	-20~60°C
Operating Humidity	10 to 85% (no condensation)
Storage Humidity	5 to 90% (no condensation)
Power Supply	+11 to 30 V DC comes with AC adaptor
Power Consumption	Approx. 36 W (LX-110 AR-LXDC100 AR-LXAO100)
Dimensions	300W x 65H x 200D (mm) excluding protrusions
Weight	Approx. 3.9kg (LX-110 AR-LXDC100 AR-LXAO100)

External Dimensions

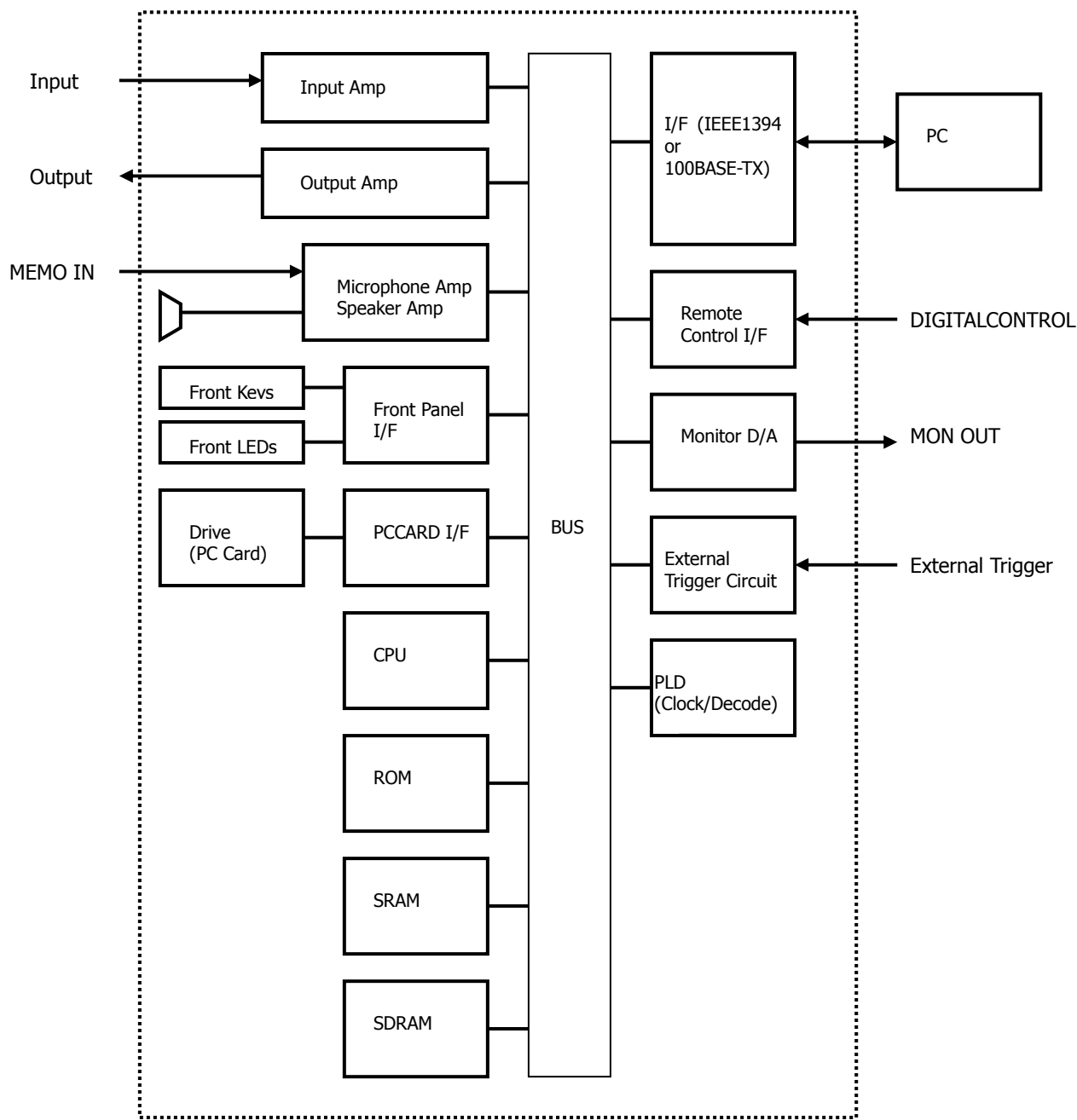


[mm]

Main Unit Specifications

Block Diagram

LX-110 8 channel input 8channel output type



Setting Tachometer Pulse Inputs

You can use the tachometer pulse inputs to the PULSE IN A/B connectors of the LX-120.

Number of Input Channels	16 bits mode: 2 channels 32 bits mode: 1 channel or 2 channels
Input Format	Threshold Level + 0.5 V, + 1 V, + 2.5 V, + 5 V, + 10 V, + 20 V selectable (Maximum input voltage +/- 50 V) (Applicable input frequency 450 kHz)
Input impedance	100 k Ω
Measurement mode	<p>(1) pulse (gate): Pulse count mode within the gate time Range: 1 to 255 times of the sampling frequency Accuracy: \pm 2 counts</p> <p>(2) pulse (total): Total counts from measurement start to stop Accuracy: \pm 5 counts</p> <p>(3) period: Cycle count mode Range: 1 msec, 5 msec, 10 msec, 50 msec, 100 msec, 500 msec, 1 sec Accuracy: +/- 0.3 % (at 16 bits mode) +/- 0.2 % (at 32 bits mode)</p> <p>(4) frequency: Frequency measurement mode Range: 10 Hz, 20 Hz, 50 Hz, 100 Hz, 200 Hz, 500Hz, 1 kHz, 10 kHz, 20 kHz Accuracy: +/- 0.3 % (at 16 bits mode) +/- 0.2 % (at 32 bits mode)</p> <p>(5) rpm: RPM measurement mode Range: 1500 rpm, 3000 rpm, 6000 rpm, 9000 rpm, 12000 rpm, 18000 rpm, 24000 rpm Accuracy: +/- 0.3 % (at 16 bits mode) +/- 0.2 % (at 32 bits mode)</p> <p>Divided Rate: 1 ~ 255 Moving Average: 1 ~ 16 Number of Pulse per Revolution: 1 ~ 255</p>
Tachometer Pulse Timing	<p>If the measurement mode is either of cycle count mode, frequency measurement, or RPM mode: Use LSB 1 bit for the tachometer pulse timing Note that this function is available at the sampling frequency of 48 kHz or lower.</p>

■ In case of 16bits A/D, 1 x 16 bits tachometer pulse input channel is equivalent to 1 x analog input channel. 1 x 32 bits tachometer pulse input channel is equivalent to 2 x analog input channels. In case of 24 bits A/D, 1 x 32 bits tachometer pulse input channels is equivalent to 1 x analog input channel. Therefore, if you turn ON tachometer pulse input channel(s), in order keep the same analog input channels, lower the sampling frequency is required by following the setting of tachometer pulse input channel(s).

■ Set **Moving Average** to [1] only, when the sampling frequency of 102.4 kHz, 100 kHz, 96 kHz, 65.536 kHz, 51.2 kHz, 50 kHz, 48 kHz, or 32.768 kHz is selected.

■ Only 1 x 32 bits tachometer pulse input can be selected when the sampling frequency of 102.4 kHz, 100 kHz, 96 kHz, or 65.536 kHz is selected.

■ The LX Navi cannot monitor the tachometer pulse input in waveform display. Use the digital display to monitor.

■ The LX cannot playback the recorded tachometer pulse input signals. Process the data as digital data file.

■ You cannot use the tachometer pulse input channels and the generator output function at the time.

■ In 24 bits A/D, 16 bits mode of tachometer input is not available.

Generator Output Specifications

Generator Output Specifications

You can use the MON OUT connector of the LX-120 for the generator output.

Number of Output Channels	1 channel
Output Level	1 to 5 V at 0.1 V steps (same as the monitor output)
Output Connector	MON OUT (Monitor output) BNC
Types of Outputs	SIN, SWEEP SIN, Pulse, Pink noise, White noise
Noise Level	-70 dB or less (at SIN output)

- You cannot use the tachometer pulse input channels and the generator output function at the time.
- You cannot use the monitor output of the analog signal when recording at the low-speed sampling series (1 kHz to 1/60 Hz).
- The upper limit of frequency of sine, sweep sine for generator output is 1/2.4 of sampling frequency.

Expansion Unit Specifications

<AU-LX100EPIO>

Expansion unit for DC100 amp / PA100 amp / ST100 amp / AO100 amp

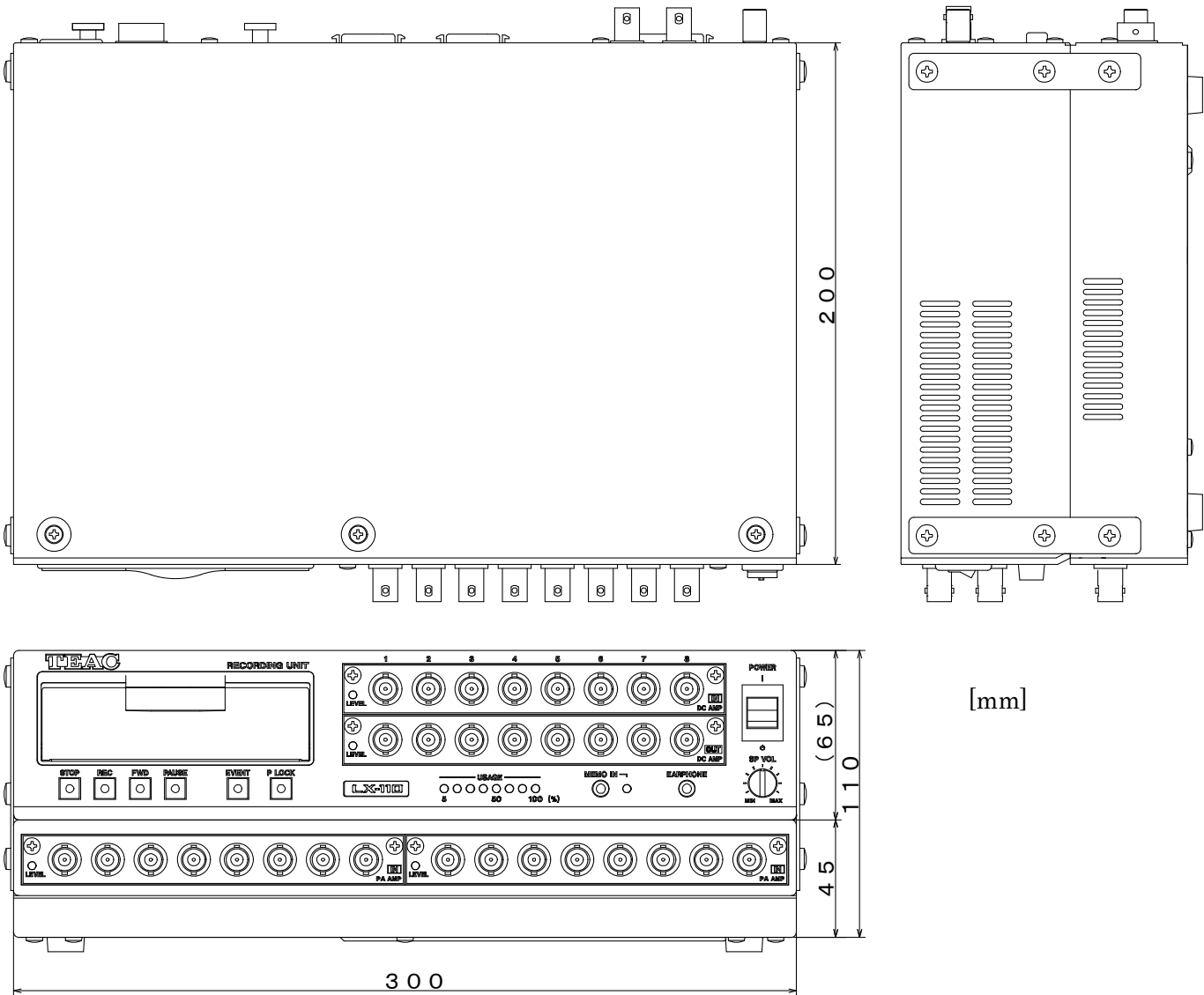
Amp Slot 2 slots

Dimensions 300W × 45H × 200D (mm) (excluding protrusions)

Weight Approximately 2 kg

Expansion Unit Specifications

External Dimensions



DC Input Amp Specifications

<AR-LXDC100>

Quantization Bits

16 bits or 24 bits switching (simultaneous sampling)

Conversion method

128-times over-sampling delta sigma modulation.

at 96 kHz sampling, 64-times over-sampling is used.

Sampling frequency

Depends on the sampling frequency of the LX main unit.

Number of Input Channels

8 channels

Input range

+/-0.5, 1, 2, 5, 10, 20, 50 Vp (Exceeded range +/-120%)

Absolute max. Input Voltage

+/- 100 V

Input impedance

1 M Ω unbalanced

Filter

Joint use of digital filter and analog filter

Linearity

+/-0.1% or less

Distortion Factor

At sampling of 96kHz, +/-0.1% or less

At sampling of 48 kHz, +/-0.07% or less

At sampling of 24 kHz or less, +/-0.4% or less.

Drift

+/-0.1% or less

Dynamic Range

86/98 dB (within bandwidth) except 20V

20V 86/96 dB (within bandwidth)

S/N

84/96 dB (within bandwidth) except 20V

20V 84/94 dB (within bandwidth)

Crosstalk

-82/-88 dB (within bandwidth, 48 kHz or lower sampling)

-80/-86 dB (within bandwidth, 96 kHz sampling)

Inter-channel phase Difference

1 degree or less (in same range with bandwidth 20 kHz or less)

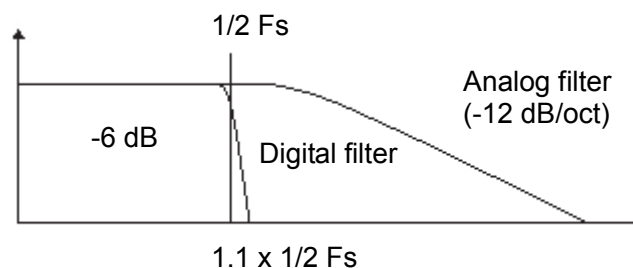
3 degree or less (in same range with bandwidth 40 kHz or less)

DC Input Amp Specifications

■ Filter Characteristics

The analog filter is a 2nd-order Butterworth filter, with a cutoff frequency that is about 1.2 times the aliasing frequency ($1/2F_s$). The filter prevents 128-times delta-sigma A/D (analog to digital) high-order aliasing.

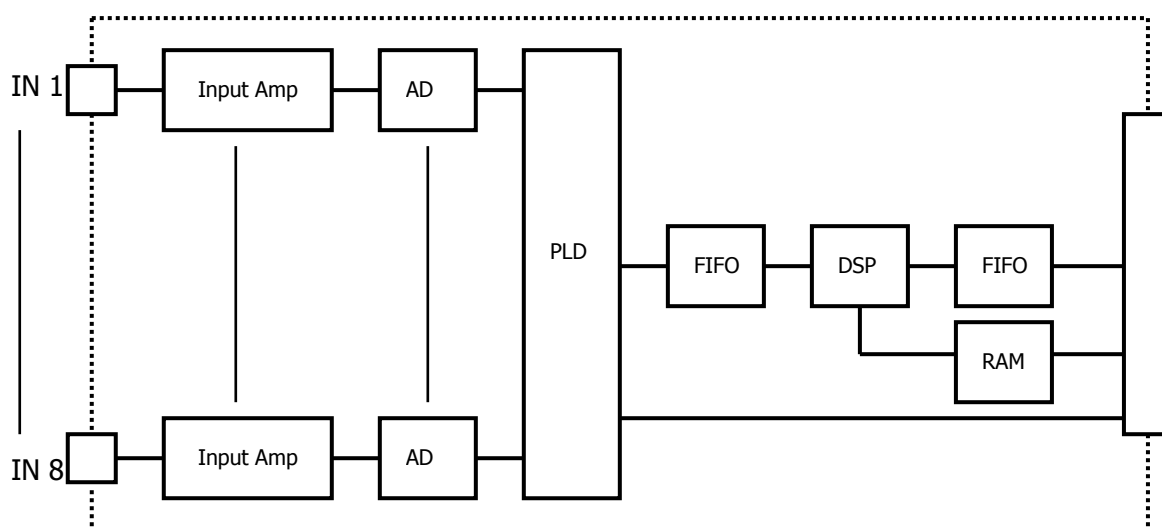
The digital filter is used when down-sampling 128-times delta-sigma A/D data. The attenuation characteristics are about -6 dB at $1/2F_s$. The aliasing component in -6 dB occurs at a sampling frequency of 1.1 times from 1 of the $1/2F_s$. The attenuation is abrupt so attenuation occurs quickly up to the noise level.



■ Calibration

When the power is turned on, all channels and all ranges self-calibrate using a DSP. In this operation, when the power is first turned on, the 2 basic signals of zero and + full scale are converted from analog to digital, and the zero point error and gain error are calculated for each range, and then stored. During recording, the data converted from analog to digital is adjusted by the calibration data for each range.

Block Diagram



PA Amp Specifications

<AR-LXPA100>

Number of Channel	8
Input Format	Balanced and unbalanced
Input Coupling	Balanced AC coupling, balanced DC coupling, unbalanced DC coupling
Input impedance	1 M Ω or more
Input range	+/-0.01 V, 0.0316 V, 0.1 V, 0.316 V, 1 V, 3.16 V 10 V, 50 V (Exceeded range ± 127 %)
Absolute max. Input Voltage	+/- 50 V (± 0.01 to 3.16 V) +/- 100 V (+/-10 V, +/- 50 V)
Filter	Joint use of digital filter and analog filter
HPF	3 rd order butterworth filter 10 Hz (+/- 0.5 dB or less), 20 Hz (+/- 0.5 dB or less)
Weighting	A curve, C curve, Flat IEC-TYPE1
Frequency Response Flatness	+/-0.5 dB
In AC mode	1 Hz to each bandwidth of the LX main unit.
In DC mode	DC to each bandwidth of the LX main unit.
Quantization Bits	16 bits (simultaneous sampling, use MSB16 bits of 24 bits ADC)
Conversion method	128-times over-sampling delta sigma modulation. at 96 kHz sampling, 64-times over-sampling is used.
Sampling frequency	Depends on the sampling frequency of the LX main unit.
Range Precision	+/-2% or less
Linearity	+/-0.1% or less
Distortion Factor	At 48 kHz or 96 kHz sampling: When the input range is 0.316 V or more: +/-0.1% or less When the input range is 0.1 V or less: +/-0.2% or less At sampling of 24 kHz or less +/-0.4% or less
Drift of 1.0 V)	+/- 0.1% or less (10 or more minutes after power is turned on, at an input range
Inter-channel phase Difference	1 degree or less (in same range with bandwidth 20 kHz or less) 3 degree or less (in same range with bandwidth 40 kHz or less)
Power to Sensor	28 V DC/4 mA, 24 V DC/4 mA (internal switch)
TEDS	Read TEDS information at the LX Navi or the color LCD remote control unit (IEEE1451.4 ver0.9 compatible)
Power Consumption	Approx. 7 W

S/N and Crosstalk

Input Range	S/N		Crosstalk	
	Within Bandwidth 20 kHz or less	Within Bandwidth 40 kHz or less	Within Bandwidth 20 kHz or less	Within Bandwidth 40 kHz or less
+/- 0.01 V	64/67 dB	60/63 dB	- 64 dB	-60 dB
+/- 0.0316 V	74/77 dB	69/72 dB	- 73 dB	-69 dB
+/- 0.1 V	83/86 dB	77/80 dB	-78 dB	-74 dB
+/- 0.316 V	87/93 dB	77/80 dB	-78 dB	-74 dB
+/- 1.0 V	87/93 dB	77/80 dB	-78 dB	-74 dB
+/- 3.16 V	87/98 dB	77/80 dB	-78 dB	-74 dB
+/- 10 V	87/98 dB	77/80 dB	-78 dB	-74 dB
+/- 50 V	80/98 dB	77/80 dB	-78 dB	-74 dB

ST Amp Specifications

ST Amp Specifications

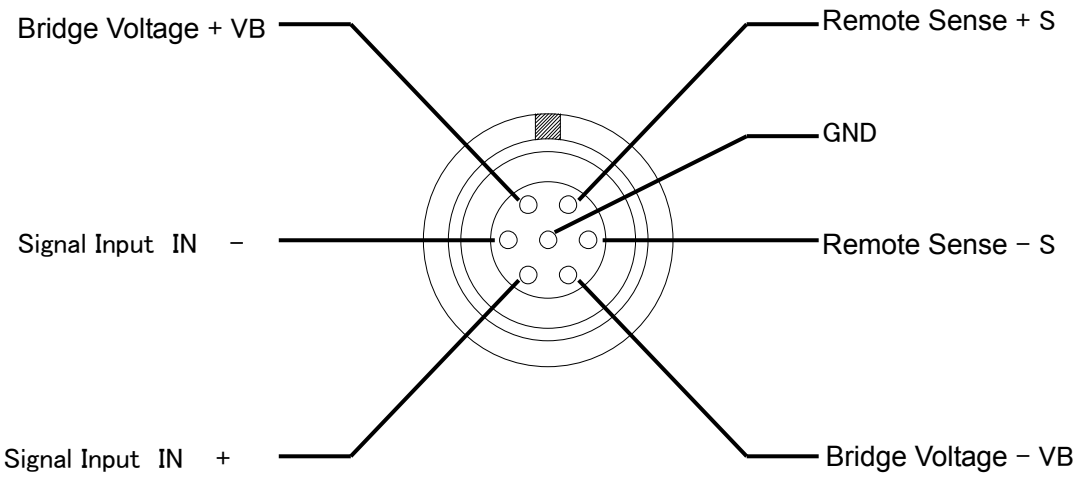
<AR-LXST100>

Number of Channel	8
Input Format	Balanced differential
Input Coupling	Balanced DC coupling, DC bridge method
Input impedance	1 M Ω
Input range	In ST mode ± 0.25 mV/V, 0.5 mV/V, 1 mV/V, 2.5 mV/V, 5 mV/V, 10 mV/V, 25 mV/V, 50 mV/V (exceeded range $\pm 127\%$) DC mode ± 1 V, 2 V, 5 V, 10 V (over range $\pm 127\%$)
Absolute max. Input Voltage	± 25 V
Filter	Joint use of digital filter and analog filter
LPF	10/30/100/300/1 k/3 k/10 k/30 kHz/Pass: - 48 dB OCT butterworth (switched capacitor filter) 8 channels independently
Frequency Response	
In ST mode	DC to 30 kHz (-3 dB)
In DC mode	DC to 40 kHz (-3 dB)
Quantization Bits	16 bits or 24 bits (simultaneous sampling)
Conversion method	128-times over-sampling delta sigma modulation. at 96 kHz sampling, 64-times over-sampling is used.
Sampling frequency	Depends on the sampling frequency of the LX main unit.
Range Precision	$\pm 0.1\%$ or less
Linearity	$\pm 0.1\%$ or less
Distortion Factor	In DC mode $\pm 0.1\%$ or less at 96kHz sampling $\pm 0.07\%$ or less at 48 kHz sampling At sampling of 24 kHz or less, $\pm 0.4\%$ or less. At ST mode, (SCF:10kHz,30kHz)10000uST $\pm 0.1\%$ or less at 24kHz, 96kHz sampling
Applicable Gage Register	120 to 2000 Ω
Gage Factor	2.0
Bridge Voltage	2 V (± 1 V) / 10 V (± 5 V)
Bridge Connection	Full bridge
Remote Sense	Available
Temperature Drift	$\pm 0.1\%/1$ degree C (10 or more minutes after power is turned on)
Balance Method	Electronic auto balance
Balance Range	± 10000 microST
Zero Balance	Auto and manual calibration by using 16 bits D/A
S/N and Crosstalk	

ST Mode	SCF		SCF		SCF	
Bridge Voltage=2V	1kHz		3kHz		10kHz	
	SNR(dB)	Cross Talk(dB)	SNR(dB)	Cross Talk(dB)	SNR(dB)	Cross Talk(dB)
± 0.5 mV	67	67	62	62	58	58
± 1 mV	73	73	68	68	64	64
± 2 mV	75	75	74	74	71	71
± 5 mV	75	75	75	75	75	75
± 10 mV	75	75	75	75	75	75
± 20 mV	75	75	75	75	75	75
± 50 mV	75	75	75	75	75	75
± 100 mV	75	75	75	75	75	75

DC Mode	SCF bypass		SCF bypass		SCF bypass		DC Mode
Input Level	Sampling Frequency(24kHz)		Sampling Frequency(48kHz)		Sampling Frequency(96kHz)		Input Range
	SNR(dB)	Cross Talk(dB)	SNR(dB)	Cross Talk(dB)	SNR(dB)	Cross Talk(dB)	
± 1 V	87/93	-77/-83	87/93	-77/-83	77/83	-74/-80	± 1 V
± 2 V	87/93	-77/-83	87/93	-77/-83	77/83	-74/-80	± 2 V
± 5 V	87/93	-77/-83	87/93	-77/-83	77/83	-74/-80	± 5 V
± 10 V	87/93	-77/-83	87/93	-77/-83	77/83	-74/-80	± 10 V

Inter-channel phase Difference	1 degree or less (in same range with bandwidth 20 kHz or less)
	3 degree or less (in same range with bandwidth 40 kHz or less)
Connector	Lemon 7-pin 10 ø (EGC0B Type)



Power Consumption	Approx. 8 W
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Output Amp Specifications

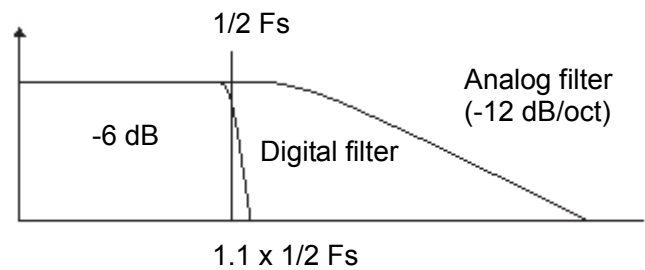
Output Amp Specifications

<AR-LXAO100>	
Num. of Output Channels	8 channel
Output Voltage	+/-1 to 5 V (0.1 V steps)
Impedance	75 Ω unbalanced
Output Current	+/-10 mA (at 20 Ω load)
Filter	Joint use of digital filter and analog filter
Linearity	+/-0.1% or less
Distortion Factor	+/-0.2% or less
Drift	+/-0.1% or less
Dynamic Range	89/95dB (within bandwidth) 25°C
S/N	87/93dB (within bandwidth) 25°C
Crosstalk	-78 dB (within bandwidth, 48 kHz or lower sampling) -75 dB (within bandwidth, 96 kHz sampling)
Inter-channel phase Difference	1 degree or less (in same range with bandwidth 20 kHz or less) 3 degree or less (in same range with bandwidth 40 kHz or less)

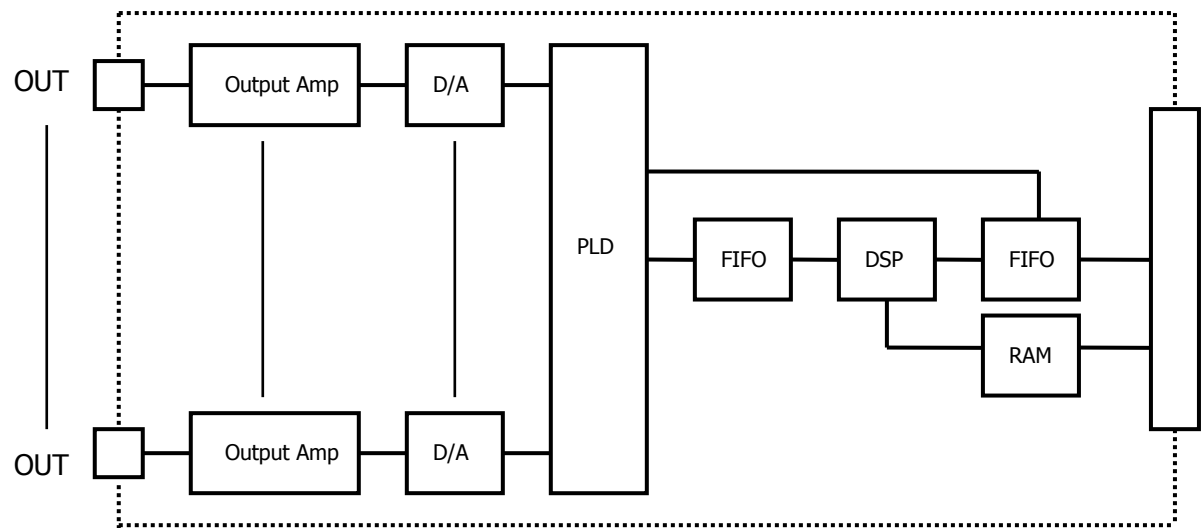
■ Filter Characteristics

The analog filter is a 2nd-order Butterworth filter, with a cutoff frequency that is about 1.2 times the aliasing frequency ($1/2F_s$).

The digital filter attenuation characteristics are about -6 dB at $1/2F_s$. The input amp and output amp are both added for the input signal, so (as shown in the following diagram) the attenuation is about -12 dB at an aliasing frequency ($1/2 F_s$).



Block Diagram



File Format

Type of Files

The LX makes a binary-format data file and ASCII-format header file each time recording stops or pauses.

Data file: Contains A/D data in binary format. The file extension is dat.

Header file: Contains recording conditions, etc., in text format. The file extension is hdr.

■ The files are stored in DOS format on the media.

■ When a voice memo is recorded, a voice memo file (extension: "wav") is made in addition to the above.

You can play this voice memo file in the Windows Media Player.

File name

The file name is common to the data file and header file. An ID number is added to the end of the specified file name. When you specify a new file name, the ID number starts from 1. After recording is stopped or paused, the ID number is automatically incremented each time the recording restarts. If a data file with the same name or same ID number already exists when recording to the media or PC, the next ID number is used.

●When Recording to Memory or to the media

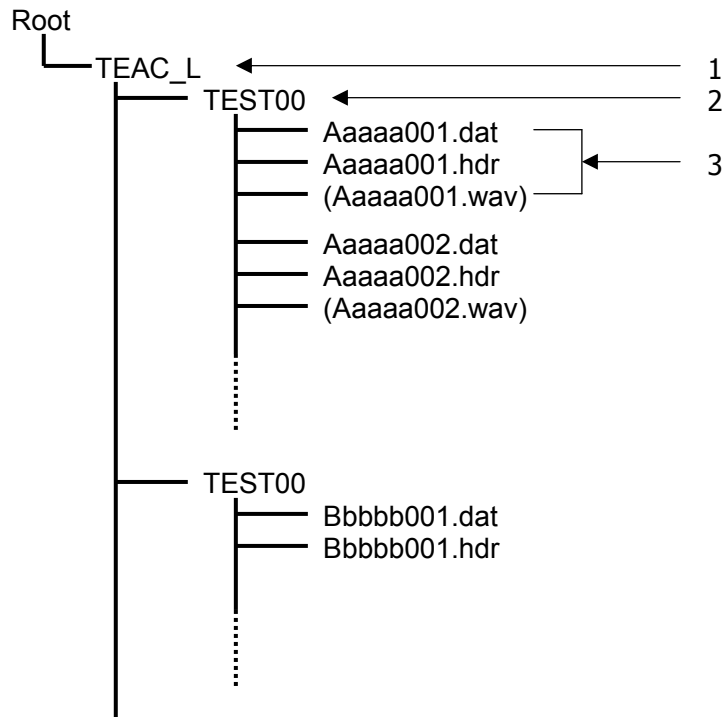
To specify a file name, choose File and New, and then specify the file name in Dataset. For the file name, use up to 5 alphanumeric characters. (Prohibited characters . , ; : < > [] * ? = " / ¥ |) The system attaches a 3-digit ID number (starting from 001) to these 5 characters to make a total of 8 characters. If the designated character is 4 or less, the portion between the characters and the 3 digits will be filled with "0", and the number of characters in the file name will become 8 in total.

●When Recording to a PC

When recording to a PC, or when recording to a PC while recording to memory or the media, there is no restriction on the length of the file name. (Prohibited characters . , ; : < > [] * ? = " / ¥ |) An ID number of up to 8 characters can be added to that file name.

Directory Structure on Media

The following diagram shows how directories are organized on the media:



1. TEAC_LX

This directory is made automatically when the media is formatted. When the media is inserted in an LX, this directory is made automatically if it does not already exist.

2. TEST0001

Name of the directory entered in Directory, which is in the dialog box displayed by choosing **File** and then **New**.

3. Aaaaa001.dat, Aaaaa001.hdr, Aaaaa001.wav

The data file, header file, and voice-memo file (if a voice memo was recorded) generated for each ID.

Data File

A/D-converted data is recorded as 2-byte integers between -32768 and +32767 in case of 16 bits A/D and also recorded as 4-byte integers between -8388608 and +8388607 in case of 24 bits A/D. Negative numbers are expressed as complements of 2.

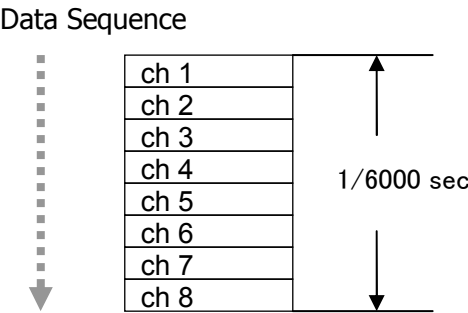
The byte order is from the lower bytes to the higher bytes (Intel format)*1.

The sequence of data is as follows: first sampling channel order, second sampling channel order,, last sampling channel order. This order is called the INTERLACED format*2, and the format name is recorded in STORAGE_MODE in the header file.

The organization of a data file is shown in the following diagram. In this document a collection of data as shown in the example is called one scan. A data file consists of scan repetitions.

Example

Data of 1 scan when recorded with a sampling frequency of 6 kHz:



Notes

*1: The byte order from the higher to the lower bytes is called the Motorola format. It is used in components such as FFT analyzers that used Motorola CPUs and in workstations.

*2: The order of data of the SEQUENTIAL format is as follows: first channel sampling order, second channel sampling order,, last channel sampling order.

Data File When Turning on Tachometer Pulse Inputs

The LX-120 can record the tachometer pulse input channel(s) assigned at either one of the following 4 tachometer pulse inputs modes along with analog channels.

2 x 16 bits tachometer input channels (Tachometer pulse input channel A and B))

1 x 32 bits tachometer input channel (Tachometer pulse input channel A))

1 x 32 bits tachometer input channel (Tachometer pulse input channel B))

2 x 32 bits tachometer input channels (Tachometer pulse input channel A and B))

25,000 are 100% range value at 16 bits mode.

1,638,400,000 is 100% range value at 32 bits mode.

In 24 bits A/D, 16 bits mode of tachometer input is not available.

The LX-120 records the tachometer pulse input data by reflecting the number of pulses per revolution and /or the pre-set divided rate.

The tachometer pulse input data are recorded at the next to the last analog channel of each scans.

See the following.

File Format

Example
8 analog channels, and 2 x 16 bits tachometer pulse input mode:
(Keyword on the header file for the tachometer pulse input channels are PULSE_CH_A 9 and PULSE_CH_B_10.)

1 scan

Channel 1 (Analog)	Bit7.....Bit0	Bit15.....Bit8
Channel 2 (Analog)	Bit7.....Bit0	Bit15.....Bit8
Channel 3 (Analog)	Bit7.....Bit0	Bit15.....Bit8
Channel 4 (Analog)	Bit7.....Bit0	Bit15.....Bit8
Channel 5 (Analog)	Bit7.....Bit0	Bit15.....Bit8
Channel 6 (Analog)	Bit7.....Bit0	Bit15.....Bit8
Channel 7 (Analog)	Bit7.....Bit0	Bit15.....Bit8
Channel 8 (Analog)	Bit7.....Bit0	Bit15.....Bit8
Tachometer Pulse Input	Channel A	
Bit7.....Bit0	Bit15.....Bit8	
Tachometer Pulse Input	Channel B	
Bit7.....Bit0	Bit15.....Bit8	

8 analog channels, and 2 x 32 bits tachometer pulse input mode:
(Keyword on the header file for the tachometer pulse input channels are PULSE_CH_A 9 and PULSE_CH_B_10.)

1 scan

Channel 1 (Analog)	Bit7.....Bit0	Bit15.....Bit8		
Channel 2 (Analog)	Bit7.....Bit0	Bit15.....Bit8		
Channel 3 (Analog)	Bit7.....Bit0	Bit15.....Bit8		
Channel 4 (Analog)	Bit7.....Bit0	Bit15.....Bit8		
Channel 5 (Analog)	Bit7.....Bit0	Bit15.....Bit8		
Channel 6 (Analog)	Bit7.....Bit0	Bit15.....Bit8		
Channel 7 (Analog)	Bit7.....Bit0	Bit15.....Bit8		
Channel 8 (Analog)	Bit7.....Bit0	Bit15.....Bit8		
Tachometer Pulse Input	Channel A			
Bit7.....Bit0	Bit15.....Bit8	Bit23.....Bit16	Bit31.....Bit24	
Tachometer Pulse Input	Channel B			
Bit7.....Bit0	Bit15.....Bit8	Bit23.....Bit16	Bit31.....Bit24	

Converting Data to Physical Quantities

In case of 16 bits AD, the AD conversion value is an integer ranging from -32768 to +32767 and the value would be ± 25000 when the input is $\pm 100\%$ in the input range settings. In case of 24 bits AD, the AD conversion value is an integer ranging from -8388608 to 8388608 and the value would be ± 6400000 when the input is $\pm 100\%$ in the input range settings. The input value is obtained from the following formula:

Input value = (A/D conversion value of the data file) x SLOPE + Y_OFFSET

■ Data of tachometer pulse input on LX-120

25,000 are 100% range value at 16 bits mode.

1,638,400,000 is 100% range value at 32 bits mode.

The LX-120 records the tachometer pulse input data by reflecting the number of pulses per revolution and /or the pre-set divided rate.

Header File

Header files are ASCII-format text files containing information such as recording conditions. Header files are based on the waveform-analysis software DADiSP format. It can be opened by Window's application software such as MemoPad or Notepad since it is a text format.

In a header file, each recording-condition entry is written on 1 line, with parameters separated by a comma (.). An example of a header file is shown as follows.

■ Example of Header File (LX-110)

```
DATASET TEST0001
VERSION 1
SERIES CH1_LX10_DC100K,CH2_LX10_DC100K,CH3_LX10_DC100K,CH4_LX10_DC100K,
  CH5_LX110_DC100K,CH6_LX10_DC100K,CH7_LX10_DC100K,CH8_LX10_DC100K
DATE 06-23-2001
TIME 16:32:55.00
RATE 1500
VERT_UNITS V,V,V,V,V,V,V,V
HORZ_UNITS Sec
COMMENT <LX-110>
NUM_SERIES 8
STORAGE_MODE INTERLACED
FILE_TYPE INTEGER
SLOPE 8.000000e-005, 8.000000e-005, 8.000000e-005, 8.000000e-005, 8.000000e-005,
8.000000e-005, 8.000000e-005, 8.000000e-005
X_OFFSET -5.0
Y_OFFSET 0.000000e+000, 0.000000e+000, 0.000000e+000, 0.000000e+000, 0.000000e+000,
0.000000e+000, 0.000000e+000, 0.000000e+000
NUM_SAMPS 59200
DATA
DEVICE LX-110
SLOT1_AMP AD_AMP,8,V1.00 ,V1.00
SLOT2_AMP DA_AMP,8,V1.00 ,V1.00
CH1_1 LX110_DC100K,RANGE=2V,FILTER=ON
CH2_2 LX110_DC100K,RANGE=2V,FILTER=ON
CH3_3 LX110_DC100K,RANGE=2V,FILTER=ON
CH4_4 LX110_DC100K,RANGE=2V,FILTER=ON
CH5_5 LX110_DC100K,RANGE=2V,FILTER=ON
CH6_6 LX110_DC100K,RANGE=2V,FILTER=ON
CH7_7 LX110_DC100K,RANGE=2V,FILTER=ON
CH8_8 LX110_DC100K,RANGE=2V,FILTER=ON
ID_NO 1
TIME 20010623163255,20010623163335
REC_MODE MO
START_TRIGGER COMMAND,PRE
STOP_CONDITION COMMAND,POST
START_PRE_COUNT 7500
STOP_POST_COUNT 15000
MARK 100,200,300
ID_END
VOICE_MEMO 8BITS,327680
LX110_VERSION V1.00 ,V1.00 ,V1.00 ,00022E202000
MEMO_LENGTH 8,0,0,0,0,0,0,0
MEMO <LX-110>
```


■ Explanations of Header File

DATASET	File name
VERSION	1 (This is a fixed value.)
SERIES	Number of the channel used for recording. The channel name is after the underscore.
DATE	Date when recording started (month-day-year)
TIME	Time when recording started (hour: minute: second)
RATE	Sampling frequency (Unit: Hz)
VERT_UNITS	Physical/engineering units of each channel
HORZ_UNITS	Time axis units (Sec: This is a fixed value)
COMMENT	Comment entered using File and New .
NUM_SERIES	Number of recording channels
STORAGE_MODE	Data order. Fixed as INTERLACED because this is the scan order.
FILE_TYPE	In 16 bits A/D, INTEGER(1data,2-byte integers) In 24 bits A/D, LONG(1data,4-byte integers)
SLOPE	Coefficient used when converting data to physical/engineering units
X_OFFSET	Location of the beginning data on the time axis. Usually is 0. minus for the pre-trigger time. Even if you set the number of scans for Pre-trigger, this will be in seconds.
Y_OFFSET	Offset used for converting data to physical/engineering units.
NUM_SAMPS	Number of data items recorded per channel
DATA	The information written after this entry is proprietary to this device, and indicates information different from the DADiSP format.
DEVICE	LX-110/LX-120
SLOT1_AMP	The ID-name, number of channels, PLD versions, and firmware versions, next to SLOT2_AMP, depending on the system configuration.
CH1_	The following information is written after the underscore: channel number, amp type, range setting, filter setting. (This is always ON for a DC amp.)
ID_NO	ID number
TIME	Recording start date and time, recording stop date and time (YYYYMMDDhhmmss)
REC_MODE	Recording destination device (MEMORY, PC CARD, PC)
START_TRIGGER	Recording start conditions: COMMAND: Interface command PANEL: FWD button of the front panel LEVEL: Level trigger DATE: When Repeat Count is 1 in the interval action TIMER: When Repeat Count is 2 or more in the interval action EXT: External Trigger TIME_OUT: Time out ,PRE: Added for a pre-trigger
STOP_CONDITION	Recording stop conditions: COMMAND: Interface command PANEL: STOP button of the front panel LEVEL: Level trigger TIMER: Specified recording time EXT: External Trigger MEMORY_FULL: Memory is full MEDIA_FULL: The media is full. ,POST: Added for a post-trigger
START_PRE_COUNT	Number of scans recorded by a pre-trigger
STOP_POST_COUNT	Number of scans recorded by a post-trigger
MARK	Number of scans at the instant an event mark was attached.
ID_END	The following information applies to the LX hardware, etc.
VOICE_MEMO	The number of bits per sample for voice-memo data. Data size (bytes)
LX10_VERSION	Firmware and PAL version of the LX main unit
(LX120_VERSION)	for LX-120
MEMO_LENGTH	Number of letters in MEMO. Fixed to "0,0,0,0,0,0" after comma
MEMO	<LX-110>

- The LX-120 attaches the following information after DEVICE.
- When the tachometer pulse input channel is set
- | | | | |
|----------------|---|--|--|
| PULSE_CH_A | Tachometer pulse input channel number, 9 for the LX has 8 analog inputs. | | |
| PULSE_MODE_A | Tachometer pulse input mode, number of bits, measurement mode number, range setting | | |
| | Measurement Mode | 0: Pulse counter mode, gate
1: Pulse counter mode, total
2: Cycle count mode
3: Frequency mode
4: RPM mode | |
| PULSE_LEVEL_A | Threshold level | | |
| DIVIDE_RATE_A | Divided rate | | |
| MOVE_AVERAGE_A | Moving average | | |
| PULSE_PER_1R_A | Number of pulse per revolution | | |

The LX may not generate some of above information depending on the selected measurement mode.

When the tachometer pulse input channel B is assigned, the information above will be changed to B from A.

Connector Specifications DIGITAL CONTROL connector

<Functions>

Contact input: REC FWD, REC, FWD, STOP, PAUSE, event, panel lock, and internal clock adjustment

Status output: REC, FWD, STOP, PAUSE, event, and panel lock

<Input/Output Circuit>

Input Format
L level: 0.4 V or less
H level: Open or 2 V or more
Pulse width: 100 ms or more

Output Format
Open drain, maximum sync current: 8 mA

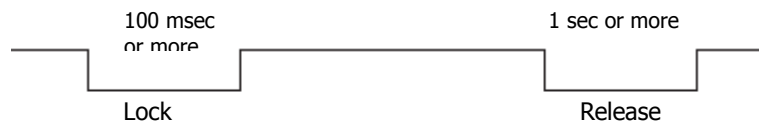
<Connector>

Angled half pitch 36-pin DHA-RC36-R1xxx series

Pin Assignment

Pin No.	Signal	Function	Pin No.	Signal	Function
1	GND	Ground	19	GND	Ground
2	RESERVED	Reserved	20	RESERVED	Reserved
3	RESERVED	Reserved	21	RESERVED	Reserved
4	GND	Ground	22	AGND	Reserved
5	RESERVED	Reserved	23	AGND	Reserved
6	RESERVED	Reserved	24	AGND	Reserved
7	GND	Ground	25	AGND	Reserved
8	RESERVED	Reserved	26	RESERVED	Reserved
9	RESERVED	Reserved	27	RESERVED	Reserved
10	RTCADJIN	Internal clock ADjustment input	28	NC	
11	RECFWDIN	REC FWD input	29	NC	
12	RECIN	REC input	30	RECSTS	REC output
13	FWDIN	FWD input	31	FWDSTS	FWD output
14	STOPIN	STOP input	32	STOPSTS	STOP output
15	PAUSEIN	PAUSE input	33	PAUSESTS	PAUSE output
16	EVENTIN	EVENT input	34	EVENTSTS	Event output
17	PLOCKIN	Panel Lock input	35	PLOCKSTS	Panel Lock output
18	GND	Ground	36	GND	Ground

For PANEL LOCK input, the control buttons on the front panel of the LX cannot be used to perform operations. The first signal locks the control buttons; the second signal releases the lock.



AQ-VU synchronization connector

Makes control of record start/stop and time setting.

<Functions>

INPUT ALARM IN

Control Output CLOCK, START STOP, EVENT TRG

Serial Output S-IF OUT 38400bps

<Input/Output Circuit>

Input Format L level: 0.4 V or less

H level: Open or 2 V or more

Output Format Open drain(pull-up to 5v at 4.7kΩ), maximum sync current: 8 mA

<Connector>

Circular connector Hirose HR25-7R-8S(71)

Pin Assignment

Pin No.	Signal	Function
1	EVENT TRG OUT	Event trigger output
2	ALARM IN	Alarm signal input
3	START STOP OUT	Start/Stop Control Output
4	GND	Ground
5	CLOCK OUT	Sampling clock output
6	S-IF IN	Reserved
7	GND	Ground
8	S-IF OUT	Internal Clock Serial Output

Recording Synchronization Specifications

Number of Units to be Synchronized	4 units
Inter-channel phase Difference	Channels with the different units 5 degree or less (in same range with bandwidth 20 kHz or less) 7 degree or less (with same range and a bandwidth of 40 kHz)
Total Synchronization Cable Length	Within 10 m

- You cannot use the IEEE1394 interface model and the Ethernet interface model mixed for the recording synchronization.
- If you use the IEEE1394 model of the LX and you need to update the LX Navi, update the device driver to the latest
- Synchronized reproducing operation cannot be done, but standalone reproducing operation of master unit can be done.
- When recording, the same settings of sampling frequency, quantization bits number, and recording media (Memory, PC Card) should be applied for both of master / slave unit. And, when controlling the master / slave unit by one PC(starting to run multi-LX Navi for multi-PC for synchronization recording), specify directory or file name without overlapping.
- Each trigger conditions can be specified on master unit only. Not to the slave unit.
- When controlling the master / slave unit by one PC, the operation at a maximum sampling frequency or the settings saving function of LX Navi might be limited to be used.
- In case synchronization recording, start to run the LX Navi in order of master unit, slave 1, slave2, ..., and quit them in reverse order of the starting to terminate the LX Navi of master unit.
- Use the optional LX View PL-S1001 wave monitor software or the AFC NEO PL-S1002 file converter software to merge the multiple files recorded.
- Keep the numbers of the main windows open in the slave units to a minimum or the real time monitor cannot be processed, depending on the sampling frequency selected.
- Specify 5 sec or more as the interval to wait before recordings (For media recording much more seconds might be required).
- Take 30 sec or more to start recording after changing sampling frequency.

Section 7 Appendix

Troubleshooting

Troubleshooting

If you encounter one of the following problems, check whether the recommended actions solve the problem before you request a repair.

Problem	Possible cause and recommended action
No power.	Check whether the DC voltage is low.
The LX Navi software does not recognize the LX.	In case of IEEE1394 model, make sure that the IEEE 1394 interface card is one of the recommended cards. In case of LAN model, make sure that both the LX and the PC have matched IP addresses. Power on the LX again, and then restart LX Navi.
The media is not recognized in the New dialog box.	Make sure that the media is formatted. Make sure you are using the specified media.
You cannot record to the media.	Make sure that the media is inserted. Make sure that the media is formatted.
The Auto Saving function for automatically saving to the media is not working.	Make sure that the media is formatted. Make sure that the media is not full. Make sure that the Auto Saving option is selected. Note that turning off the power will disable the Auto Saving option. You must enable it each time you turn the power on.
The buttons on the main unit are disabled.	Make sure that panel is not locked (P LOCK button). If the panel is locked, release the lock.
You cannot set the sampling frequency.	Make sure that number of the channels you activate is larger than available number of the channels at the sampling frequency in case turning on the tachometer input channels.

If you perform the recommended action but the problem remains, contact TEAC's service department.

Supplied Accessories and Options

Supplied Accessories

DC Power Cable	1
Microphone	1
Earphone	1
Ferrite Core	2
CD-ROM	1
(Supplied Software, Instruction Manual)	
Summary Instruction Manual	1
Summary Instruction Manual (English version)	1(Only for the Export model)
AC Adaptor	1

Optional parts

Expansion Unit	AU-LX100EPIO
Battery Enclosure	BU-81
Battery Pack	HP-30L (PACO ELECTRONICS INDUSTRY INC.)
Remote control unit with color LCD	ER-LXRC100

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